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A TAXONOMY OF GOODS
PROCURED BY THE FEDERAL GOVERNMENT:
APPLICATIONS AND BENEFITS

by

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Important research efforts have advocated the concept of contracting as a science. One of the key criteria required for a discipline to be recognized as a science is a description and classification of the subject matter. In order to meet this criterion, a model was developed which classifies goods procured by the Federal Government. Further research validated the classification scheme and suggested some improvements. An important criterion of any classification scheme is its usefulness. This thesis examines potential applications and benefits of the previously developed taxonomical structure for classifying goods procured by the Federal Government. Potentially useful applications of the taxonomy of goods include market research, procurement regulation, and training and education.

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A Taxonomy of Goods
Procured by the Federal Government:
Applications and Benefits

by

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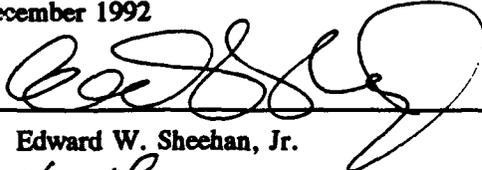
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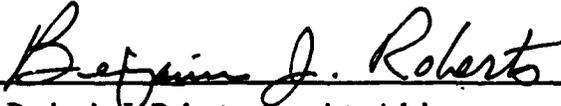
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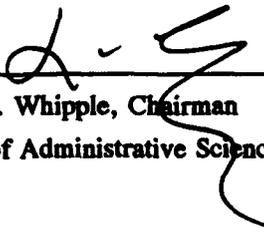
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ABSTRACT

Important research efforts have advocated the concept of contracting as a science. One of the key criteria required for a discipline to be recognized as a science is a description and classification of the subject matter. In order to meet this criterion, a model was developed which classifies goods procured by the Federal Government. Further research validated the classification scheme and suggested some improvements. An important criterion of any classification scheme is its usefulness. This thesis examines potential applications and benefits of the previously developed taxonomical structure for classifying goods procured by the Federal Government. Potentially useful applications of the taxonomy of goods include market research, procurement regulation, and training and education.

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I. INTRODUCTION

A. BACKGROUND

One of the most potentially significant concepts proposed in the field of Government contracting is the idea that contracting is a science. The concept of contracting as a science came about as a result of the growing complexity and increasing difficulties in the procurement process. These problems emphasized the need for procurement research as a means of obtaining a better understanding of the intricacies and effects of the procurement process. The key to effective research is the use of a systematic approach to solving problems. The concept of contracting as a science implies that a systematic and organized process can be employed for development and validation of contracting knowledge. (Park, 1986, pp. 12-13)

Among the requirements identified as differentiating sciences from other disciplines is the description and classification of the subject matter. (Park, 1986, p. 41) The pursuit of this requirement lead to the development of a taxonomical structure for classifying goods procured by the Federal Government. The taxonomy, developed by Brian Wenger in 1990 (Wenger, 1990), classifies goods procured by the

Federal Government along a continuum from simple to complex, according to inherent characteristics of the goods deemed important in the procurement process.

Wenger reported that the major benefits of his study were that accurate questions could be asked on how the perceived order of goods has arisen and how best to maintain or improve it. The taxonomy provides the structure necessary for identifying the types of goods purchased by the Government in a profile that lends itself to increased visibility. Wenger also identified accurate determination of the best procurement strategy for buying certain products as another benefit of having a goods classification scheme. Wenger's taxonomical structure for classifying goods is a scheme that can be used to classify Government goods on a strategic basis. (Wenger, 1990, pp. 2-3)

At this stage of development of the taxonomical model for classifying goods procured by the Federal Government, it is appropriate to consider the usefulness of the taxonomy by examining practical applications and benefits of the model. Consideration of practical applications and benefits of the taxonomy seems appropriate for two reasons. First, it is important to bridge the gap between researchers and practitioners.

> Many people in the scientific community believe that research, like virtue, is its own reward. Procurement research is not quite that exalted. Harried

administrators and impatient Congressmen want to see results--practical applications that will improve the procurement process. (Roback, 1975, p. 4)

The second reason to consider practical applications is to provide direction for future research and refinement of the taxonomical model. The most important evaluation criterion of a classification scheme is how useful it is in helping solve problems. (Hunt, 1983, p. 360) In order to refine and advance the taxonomy, the applications for which the model is intended, and the resulting benefits, should be understood.

B. OBJECTIVES

The primary objective of this research effort is to identify potentially useful applications of the taxonomy of goods procured by the Federal Government, and examine the benefits of the applications. Specific objectives of the study are to:

1. Identify potential applications of Wenger's taxonomy.

2. Examine the most promising applications in detail, including the logic of how the system would work, and the benefits to be gained from the applications.

3. Validate the requirement that the taxonomy be useful.

C. RESEARCH QUESTIONS

The following research questions framed the research

for, and were addressed in, this study.

<u>Primary Research Question</u>:

Would application of the taxonomy of goods procured by
the Federal Government be useful in the discipline of
contracting?

<u>Subsidiary Research Questions</u>:

1. Are there taxonomical applications in other
disciplines that can be extrapolated to the contracting
field?

2. What are the potential applications of the taxonomy
of goods procured by the Federal Government in the field
of contracting?

3. What are the most promising applications of the
taxonomy in the field of contracting?

4. In the most promising areas of application, how
would the taxonomy be applied?

5. What are the benefits of applying the taxonomy of
goods procured by the Federal Government in the most
promising areas selected for examination?

D. RESEARCH METHODOLOGY

The research conducted in support of this study involved

a literature review, telephone interviews, and written

correspondence with experts in the contracting field.

The research effort began with a comprehensive

literature review in the subject areas of classification,

taxonomy, and categorization. There were two separate and

distinct goals of the literature review. The first goal was

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to develop the theoretical framework of classification. That is, the "how" and "why" of taxonomies. The second goal of the literature review in the subject areas was to examine existing taxonomies in other disciplines for corollary applications in contracting.

Although there was only a limited amount of literature available on the theory of classification, the literature that was available was both consistent and fruitful. On the other hand, the literature describing taxonomies in othe_ disciplines was plentiful, but of limited use. With the exception of taxonomies in the discipline of marketing, the literature in this area provided very little discussion in support of the logic of why the particular application presented was appropriate and useful. Most of the taxonomies reviewed were applied for the purpose of discipline research.

After developing the theoretical framework of classification, a list of potential applications of the taxonomy of goods procured by the Federal Government was developed. These applications were derived primarily from the marketing literature, and the researcher's judgment.

Telephone interviews were then conducted with 12 experts in the field of contracting to solicit comments regarding the applications and seek additional applications not considered by the researcher. Some interviews were more

fruitful than others. Among the 12 experts contacted were nine of the 12 expert panel members who participated in the Wenger study. In cases where the interviewee did not have time to discuss the subject on the telephone, preferred to communicate in writing, or wanted additional time to consider the subject, written correspondence was forwarded.

Based on information from the literature reviewed, input from experts, and the researcher's judgment, potential applications and benefits of the taxonomy were identified. Following this step, a literature review was conducted in the areas identified for application of the taxonomy. From the literature review, three particular applications were selected for examination. The three areas of application, market research, procurement regulation, and training and education, were selected and expanded upon because they have been identified as areas needing improvement in the field of contracting. (Refs: Sherman, 1991, p. 120; Judson, 1986, p. 14; Mavroules, 1991, p. 19) As such, it was determined that application of the taxonomy would yield great benefits in the selected areas.

Finally, the three selected applications were developed, and potential benefits were proposed.

E. SCOPE, LIMITATIONS, AND ASSUMPTIONS

The scope of the study is limited to an assessment of
the potential applications and benefits of the Wenger
taxonomical structure for classifying goods procured by the
Federal Government. The Wenger classification scheme is one
of several approaches which have been taken in the field of
Government contracting. Other classification studies have
been conducted in the areas of contracting officer tasks
(Fowler, 1987 and Page, 1989), contracting literature
(Sweeney, 1989 and Smith, 1991), and services procured by
the Federal Government (Allen, 1991). Although these other
classification schemes are beneficial, applications proposed
in this study are addressed from the context of the Wenger
taxonomy of goods.

With regard to limitations, the proposed applications
were not operationalized because the goods procured by the
Federal Government have not yet been classified.

Assumptions made during the study were that all of the
goods procured by the Federal Government could in fact be
classified, and the list of characteristics used to classify
goods may be modified.

F. LITERATURE REVIEW

The model upon which this study is based is presented in
"A Taxonomical Structure for Classifying Goods Purchased by

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the Federal Government," a graduate thesis by Brian Wenger. (Wenger, 1990) This thesis also provided the basic theory of classification.

The book Taxonomies of Human Performance: The Description of Human Tasks by Edwin A. Fleishman and Marilyn K. Quaintance proved to be the most substantial source of the theory behind taxonomies. (Fleishman and Quaintance, 1984) It not only explained how to classify, it also explained the logic behind what classification can accomplish.

The book Marketing Theory: The Philosophy of Marketing Science by Shelby D. Hunt was also a rich source of information regarding classification theory. (Hunt, 1983)

As far as providing the logic behind applying taxonomies and the resulting implications, the journal article "Product Characteristics and Marketing Strategy" by Gordon E. Miracle proved to be far and away the most useful reference to be found. (Miracle, 1965)

G. ORGANIZATION OF STUDY

The organization of this study was developed around the primary purpose, developing useful applications of the taxonomy of goods procured by the Federal Government, and examining the benefits of those applications. Along those lines, this chapter has presented the research objectives,

questions, methodology, scope, limitations, assumptions, and literature review.

In Chapter II, the background and events leading to the present study are presented, along with definitions and some basic principles of classification. The Wenger model is also described, as well as the marketing scheme upon which it is based.

Chapter III describes the objectives of classification and the usefulness of taxonomical applications. From there, the role of taxonomies in contracting is presented, and specific applications are identified.

Chapters IV, V, and VI present the three applications of the taxonomy selected for discussion: market research, procurement regulation, and contracting training and education, respectively. Each application is formed by presenting background on the subject area, the reasoning behind the application, and the benefits to be gained from implementation of the taxonomy of goods procured by the Federal Government.

Chapter VII presents the conclusions and recommendations resulting from the study.

II. BACKGROUND

A. INTRODUCTION

The classification studies conducted in the field of Government procurement have been a continuation of the concept of contracting as a science. (Prendergast, 1991, p. 9) This concept was first proposed by Robert Williams and Paul Arvis in a paper presented to the Federal Acquisition Research Symposium in 1985 (Williams and Arvis, 1985), and subsequently examined in research conducted by Steven Park in 1986. (Park, 1986, p. 12) The concept of framing the field of contracting as a science is useful because it advocates a systematic and organized method for exploring and defining the discipline.

Government procurement is a complex field. There are conflicting requirements placed on the process by the many goals of the system. For example, the Federal procurement process is expected to obtain quality products at fair and reasonable prices. At the same time, the process serves as an instrument of foreign policy through the foreign military sales (FMS) program, social policy through socioeconomic programs, and fiscal policy through fluctuations in spending levels. The procurement process serves as a tool for carrying out many other policy goals. The result is a

complex process with requirements often at odds with one another. Government procurement stands to benefit from an organized and systematic approach to studying the field.

Park proposed the following as characteristics differentiating science from other disciplines.

1. A distinct subject matter.

2. The description and classification of the subject matter.

3. The presumption of underlying uniformities and regularities concerning the subject matter.

4. The adoption of the method of science for studying the subject matter. (Park, 1986, p. 41)

It is the second characteristic of a science, the description and classification of the subject matter, that has been the motivation behind the classification studies conducted in contracting to date.

B. DEFINITION OF TERMS

For purposes of this study, the following definitions apply:

Classification: The ordering or arrangement of entities into groups or sets on the basis of their relationships, based on observable or inferred properties.

Classificatory system: The end result of the process of classification, generally, a set of categories or taxa.

Taxon (plural: taxa): A group or category in a classificatory system resulting from some explicit methodology.

Taxonomy: The theoretical study of systematic classifications including their bases, principles,

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procedures, and rules. The science of how to classify and identify. (Fleishman and Quaintance, 1984, p. 22)

A taxonomy is more than a mere classification. It is the study of systematic classification, each with some reference to theoretical models that embrace the domain to which the taxonomy is to be applied. (Fleishman and Quaintance, 1984, p. 22)

C. PRINCIPLES OF CLASSIFICATION

All classificational systems involve partitioning some universe of objects, events, or other phenomena into categories that are homogeneous with respect to the selected characteristics. However, there are two different approaches for generating classificational schemata, which in turn impact the applications for which they may be used. The two procedures are logical partitioning and grouping. (Hunt, 1983, p. 349)

Logical partitioning is sometimes referred to as deductive or a priori classification. With logical partitioning, the classificational schema is always developed before any specific set of data is analyzed. This procedure imposes a classificational system on the data. It starts with specification of the phenomena to be categorized (e.g., goods, services), followed by delineation of the categorial terms, which are the properties or characteristics of the phenomena on which the

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classificational schema is to be based (e.g., unit cost, age). Finally, the various categories that emerge from applying the categorial terms to the phenomena are labeled. (Hunt, 1983, pp. 349-350)

Logical partitioning usually results in monothetic classifications. That is, all members of a category possess all of the characteristics or properties used to identify the category. Another observation about logical partitioning is that it may result in empty categories, or a category to which no phenomenon belongs. Finally, logical partitioning presupposes a fairly complete understanding of the phenomena under investigation. (Hunt, 1983, pp. 350-353)

The other classification procedure, grouping, is sometimes referred to as inductive, ex post, or quantitative classification; or numerical taxonomy. With grouping procedures, the classificational schema is generated only after some specific set of data is analyzed. Grouping procedures, like logical partitioning, start with specification of the phenomena to be classified and the properties or characteristics on which the categorizing is to be done. However, unlike logical partitioning, all grouping procedures determine categories after, and as a result of, analysis of a specific set of data. (Hunt, 1983, pp. 349-350)

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Grouping procedures usually result in polythetic classifications. This means that phenomena in any given class may share many characteristics in common, however, no individual phenomenon need possess all of the characteristics of the class. Unlike logical partitioning, grouping procedures do not result in empty categories since the categories are formed from existing observations. (Hunt, 1983, p. 354)

There are several implications of the two different approaches to classification which suggest that grouping procedures, as employed by Wenger, are appropriate for the taxonomy of goods procured by the Federal Government. With the diversity of goods procured by the Federal Government, logical partitioning procedures, which usually result in monothetic classifications, would result in either too many categories, or categories based on no more than two or three characteristics, neither of which would be useful. Grouping procedures are better equipped to handle large numbers of categorial properties. (Hunt, 1983, p. 353) And most importantly, grouping procedures require substantially less a priori knowledge concerning which specific properties are likely to be powerful for classifying phenomena than does logical partitioning. (Hunt, 1983, p. 355)

D. EVALUATION CRITERIA

Several criteria have been suggested for evaluating
alternative classificational schemata.

1. Does the schema adequately specify the phenomenon to
   be classified?

2. Does the schema adequately specify the properties or
   characteristics that will be doing the classifying?

3. Does the schema have categories that are mutually
   exclusive?

4. Does the schema have categories that are
   collectively exhaustive?

5. Is the schema useful? (Hunt, 1983, p. 355)

The first criterion inquires whether the schema
adequately specifies the phenomenon to be classified. The
answer is not always clear. For example, a classification
of goods may actually be classifying consumers' perceptions
of goods. (Hunt, 1983, p. 356)

The second criterion suggests that characteristics
should meet the test of differentiation of the objects, be
relevant to the end-use goal, ascertainable to the
evaluator, and consistently applied. (Wenger, 1990, p. 15)

Mutual exclusivity refers to the case where an object to
be classified fits into one category only. No single item
may be placed in two different categories at the same level.
(Hunt, 1983, p. 359)

The fourth criterion suggests that every item that is to
be classified should fall within one of the categories of

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the scheme. If, in an attempt to make the scheme collectively exhaustive, an "other" category is created and becomes too large, the system should be reevaluated. (Hunt, 1983, p. 360)

In discussing classification systems in the field of marketing, Shelby Hunt called the fifth criterion the most important. "Therefore, the ultimate criterion is usefulness. How useful is the schema for helping marketing managers solve problems?" (Hunt, 1983, p. 360) In order to be valid, the applications or uses of the schema must be clearly understood.

E. GOVERNMENT CLASSIFICATION SCHEMES

There are presently two well known classification schemes which exist within the Federal Government. These are the Federal Supply Classification (FSC) and the Standard Industrial Classification (SIC).

The FSC is a commodity classification which categorizes goods by commodity group. Groups and classes have been established with emphasis on items known to be in the supply systems of the Federal Government. The primary basis of placement is the physical or performance characteristics of the good. Items that are normally requisitioned or issued together or make up a related grouping for supply management purposes are included in the same class. (Wenger, 1990, p.

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17) Any insight that may be provided by the FSC would tend to be helpful in supply management rather than procurement.

The SIC is organized to reflect the structure of the U.S. economy with the business establishment as the unit classified. Placement is based on the establishment's primary activity, which is determined by identifying the predominant product or group of products produced or handled. The SIC aids in the collection, tabulation, and presentation of statistical data relating to business establishments. (Wenger, 1990, p. 18)

While both of these classification schemes serve their purposes, neither provides insight into the Government procurement process. (Lamm and Wenger, 1991, p. 240) Wenger developed a classification scheme intended for use specifically within Federal Government procurement. The Wenger taxonomy segments goods into clusters in which individual goods share the same end-item characteristics. These characteristics are focused on considerations deemed important in the buying process. (Lamm and Wenger, 1991, P. 240)

F. MARKETING CLASSIFICATION SCHEMES

In considering the application of a taxonomy of goods in the discipline of contracting, much can be learned from the experience of those in the discipline of marketing.

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Marketing seems to be several years ahead of the field of contracting in its attempt to frame the discipline as a science. Marketing theory has a longstanding tradition of classifying goods and services. Classification is deemed essential to the development of a descriptive theory, it establishes the basic definitions of the discipline. (Bell, 1986, p. 13) Classificational schemata play a fundamental role in the development of a discipline since they are the primary means for organizing phenomena into classes or groups that are amenable to systematic investigation and theory development. (Hunt, 1983, p. 348)

Beyond marketing's precedence both in seeking recognition as a science and developing taxonomies in pursuit of that recognition, marketing has benefitted from the application of classificational schemata. Marketing has recognized that the ultimate criterion of a taxonomy is its usefulness in helping managers solve problems. (Hunt, 1983, p. 360) Much insight can be gained from the field of marketing.

There are many classification schemes in marketing. Among them are classification schemes for different kinds of goods (e.g., convenience, shopping), stores (e.g., department stores, limited line stores), wholesalers (e.g., general merchandise, general line), and pricing policies (e.g., cost-plus, demand oriented). (Hunt, 1983, p. 348)

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These classification schemes guide strategic management decisions with respect to the appropriate marketing mix for the given entity.

The marketing mix serves the marketing management process by strategically blending the four basic marketing elements to appeal to a firm's target market. The four basic marketing elements, often referred to as the four P's, are product, price, promotion, and place (distribution channel).

Product policy is an important aspect of marketing. It involves determination of the number of variations in products to be offered, including the degree of product homogeneity or heterogeneity. Pricing policy depends on the degree to which a firm has control over the price. If the firm has no control over the price, for example if it is set by the market place or by custom, then the only pricing policy decision to be made is whether or not to sell at the going price. Pricing policies are established with regard to the degree of variation from customer to customer and adherence to list prices versus price negotiation for each sale. Promotional policy entails decisions as to how much effort is to be placed on mass media advertising or personal selling. Channel policy involves decisions with regard to the types of distributors and numbers of each type. For example, an intensive distribution policy involves

utilization of all available outlets regardless of their characteristics. A highly selective distribution policy involves utilization of only a few outlets selected according to their capabilities and suitability. (Miracle, 1965, pp. 21-22)

Marketing classification schemes generally link the elements of the marketing mix with categories within the classification scheme. Classification schemes provide marketing managers with general guidelines for the appropriate marketing mix. They help predict a coordinated product, price, promotion, and distribution strategy for success. Based on the category in which a product belongs, the classification scheme suggests an optimal marketing mix. The classification scheme can also provide insight into which elements should be adjusted in order to reposition the product into another category, which may be more profitable or compatible with a firm's goals.

The purpose of any product classification scheme is to guide managerial decision making. A comprehensive marketing strategy should be based upon product characteristics. (Murphy and Enis, 1986, p. 35) Gordon Miracle developed a product characteristics classification scheme in 1965 (Miracle, 1965). This scheme, which served as the basis for the development of Wenger's model, deserves close consideration. As expressed by Miracle:

The term marketing mix suggests a relationship between interacting elements. The development of the term constituted a step forward in the classification of interrelated marketing efforts. Although more is becoming known about the relationships among elements of the marketing mix, it is still common practice to think of it as a blend of marketing efforts, essentially nonquantifiable, the development of which often depends on experience, judgment, and perhaps a measure of good fortune.

The concept of a system provides a means of improving further the framework within which we think about the interrelationships between and among marketing activities. After all, a business firm engages in marketing activities (endogenous factors in the system) in order to adapt to its environment (exogenous factors). This adaptation is intended to move the firm toward an equilibrium in which the level of operation is such that the goals of the firm are being achieved. (Miracle, 1965, p. 19)

Miracle's classification scheme links product characteristics and the marketing strategy. The premise of Miracle's scheme is that an observable relationship exists between the characteristics of a product and the approximate marketing mix for that product. (Miracle, 1965, p. 19)

In discussing product characteristics, Miracle provides that a product is defined as the sum of the physical and psychological satisfactions the buyer receives in the purchase. Or, it can be thought of as a bundle of utilities, the total product includes all the features and conveniences for which the consumer pays. Miracle suggests that product characteristics incorporate what may be thought

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of as consumer characteristics or market characteristics.

For example:

> The amount of time and effort spent in purchasing a
> product may seem to be a consumer characteristic. But
> if convenience of location is part of the bundle of
> utilities and hence part of the total product for which
> the consumer pays, it seems reasonable that the short
> length of time the consumer spends searching for a place
> to buy a pack of cigarettes is a characteristic of the
> product. The convenience is provided as one feature in
> the bundle of utilities. Another way of stating this
> point is that the nature of the product determines how
> much time (or what kinds of effort) consumers will wish
> to spend in buying the product. Thus, consumer and
> market characteristics may be described in terms of
> product characteristics. (Miracle, 1965, pp. 19-20)

The extremely important point here is that the

characteristics deemed important in the marketing process

can be incorporated into the product classification scheme.

The same holds true for characteristics deemed important in

the Federal procurement process.

Miracle's classification scheme utilizes the nine

product characteristics listed in Table 2-1. Characteristic

values range from very low to very high. Table 2-2 provides

the product characteristics of the five groups.

TABLE 2-1
PRODUCT CHARACTERISTICS

1. Unit Value
2. Significance of each individual purchase to the consumer
3. Time and effort spent purchasing by consumers
4. Rate of technological change (including fashion changes)
5. Technical complexity
6. Consumer need for service (before, during, or after the sale)
7. Frequency of purchase
8. Rapidity of consumption
9. Extent of usage (number and variety of consumers and variety of ways in which the product provides utility)

(Miracle, 1965, p. 20)

TABLE 2-2
PRODUCT CHARACTERISTICS BY GROUP

Product Charac.	Group I	Group II	Group III	Group IV	Group V
1.	Very low	Low	Medium to high	High	Very high
2.	Very low	Low	Medium	High	Very high
3.	Very low	Low	Medium	High	Very high
4.	Very low	Low	Medium	High	Very high
5.	Very low	Low	Medium to high	High	Very high
6.	Very low	Low	Medium	High	Very high
7.	Very high	Medium to high	Low	Low	Very low
8.	Very high	Medium to high	Low	Low	Very low
9.	Very high	High	Medium to high	Low to Medium	Very low

(Miracle, 1965, p. 20)

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Individual products are subjectively assigned values for each of the nine characteristics. Depending on the value assigned to the product's characteristics, the good is placed in one of five categories, ranging from one extreme to the other. Miracle provided the following examples as products belonging to each group.

Group I: Examples are cigarettes, candy bars, razor blades, soft drinks.

Group II: Examples are dry groceries, proprietary pharmaceuticals, small hardware items, industrial operating supplies.

Group III: Examples are radio and television sets, major household appliances, women's suits, tires and inner tubes, major sporting and athletic equipment.

Group IV: Examples are high quality cameras, heavy farm machinery, passenger automobiles, high quality household furniture.

Group V: Examples are electronic office equipment, electric generators, steam turbines, specialized machine tools.

Miracle acknowledged that it is an artificiality to classify products by groups, that it would be more accurate to place products on a continuum ranging from one extreme to another. It should also be noted that a product may not always remain in the same category. For example, a product may initially fall into a certain category, then, as consumers accept the product, time and effort spent in purchasing the product is reduced, or as other characteristics change, the product may move into another

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category. If a manager takes note of this process, an effort can be made to differentiate or modify a characteristic to move the product back to its original category, or another, if so desired. (Miracle, 1965, p. 21)

Miracle's classification scheme can be used to predict the nature of the marketing mix that would be suitable for a given product. As an example of how the classification scheme can be used, Miracle provides that the marketing mix for a product in group I should be substantially as follows:

1. Relatively little effort and money spent on product development. Since a standard variety of the product is suitable for a broad group of customers, there is relatively less need for frequent change than for products in other groups.

2. Considerable effort spent in achieving intensive distribution. Products must be available quickly and conveniently.

3. Heavy consumer advertising--little or no personal selling. Consumers typically are pre-sold by advertising.

4. Relatively little effort and time spent on pricing. Firms have little control over price; variations in price are relatively infrequent; prices are not negotiated between seller and consumer. (Miracle, 1965, p. 23)

In contrast to the above, products in group V are usually:

1. Custom built.

2. Sold directly from the manufacturer to user.

3. Sold primarily by salesmen, rather than advertising.

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4. Sold on the basis of an individually negotiated price. (Miracle, 1965, p. 24)

Miracle's product classification scheme demonstrates how a taxonomy can provide strategic guidance and predict successful policy decisions. The lessons from marketing, which can be extrapolated to the contracting field, suggest that a taxonomy of goods could serve to advance many aspects of contracting.

G. TAXONOMY OF GOODS PROCURED BY THE FEDERAL GOVERNMENT

The taxonomical model developed by Brian Wenger in 1990 has its roots in the field of marketing. Wenger's taxonomy of goods procured by the Federal Government is based on the classification scheme developed by Gordon Miracle, described above. The conceptual basis for the classification scheme was to classify Government goods in a way that offers strategic insight into the buying process. The goal was to create a classification scheme that would highlight the various categories of goods and their related characteristics to allow streamlining and tailoring of contracting policies, methodology, and procedures. (Wenger, 1990, p. 25)

1. Development of the Model

To begin with, Wenger developed a preliminary list of 22 characteristics to be used in the classification scheme. The characteristics were selected by combining those used by Miracle, along with additional characteristics discussed in Robert Judson's analysis of the acquisition environment (Judson, 1986, p. 15). The 22 preliminary characteristics are listed in Table 2-3. The characteristics were then refined with the assistance of an expert panel consisting of 12 National Contract Management Association (NCMA) Fellows. Based on input from the expert panel, the list of 22 preliminary characteristics was narrowed to 12 characteristics describing Government goods from a strategic viewpoint. (Lamm and Wenger, 1991, p. 241)

TABLE 2-3
PRELIMINARY CHARACTERISTICS

1. Unit Value
2. Significance of each individual purchase to the Government
3. Time and effort spent purchasing by the buyer
4. Rate of technological change
5. Technical complexity
6. Need for service (before, during, or after sale)
7. Frequency of purchase
8. Rapidity of consumption
9. Extent of usage (number and variety of users and variety of ways in which the good provides utility)
10. Amount of price negotiation
11. Alternative sources availability
12. Degree of contractor financing required
13. Amount of product homogeneity
14. Factors considered by the buyer (price, quality, availability, and technology)
15. What determines price
16. Amount of choice available to the buyer
17. Stability of requirements
18. Amount of short-range versus long-range planning involved
19. Usage - planned and useful consumption or acquired as "insurance" (e.g., major weapon systems)
20. Extent to which goods are customized
21. Extent to which buyer exercises judgment in meeting needs of requiring activity
22. Nature of demand for the good

(Wenger, 1990, p. 27)

The characteristics were then defined and scaled from one to five to allow comparisons between a particular good and the characteristics. (Lamm and Wenger, 1991, p. 241) The final 12 characteristics, along with their definitions and scaling are provided below.

1. **Change** describes the good's rate of
    technological transformation. With some goods,
    their rate of technological change is very low.
    Their design is fixed and rarely, if ever,
    changes.   Contrast this with those goods that
    are affected by state-of-the art technology and
    are characterized by a high rate of
    technological obsolescence.
    SCALE:
    1 Very low rate of technological change
    2 Low rate of technological change
    3 Medium amount of technological change
    4 High rate of technological change
    5 Very high rate of technological change

2. **Complexity** describes the good's technical
    intricacies. The degree of a good's technical
    complexity may be thought of in terms of the
    skill and expertise needed to produce the good.
    Another way to determine complexity is whether
    the good is a system, sub-assembly, component,
    piece part, or raw material. For scoring
    purposes, 1 indicates little or no technological
    complexity with 5 being very high complexity.
    SCALE:
    1 Very low technical complexity
    2 Low technical complexity
    3 Medium technical complexity
    4 High technical complexity
    5 Very high technical complexity

3. **Customization** is the degree to which the good is
    manufactured to the buyer's specifications.
    Some goods, those that are strictly commercial,
    have no amount of customization while others are
    produced exclusively for a buyer, e.g. the
    Government. Goods that are not customized
    should be scored 1 with those developed
    exclusively for the Government scored 5.
    SCALE:
    1 No amount of customization
    2 Low degree of customization
    3 Medium amount of customization
    4 High amount of customization
    5 Made exclusively for the Government

4. **Maintainability** refers to the amount of maintenance considerations associated with the good. In other words, how frequently, if at all, is maintenance required on the good. Some goods are virtually maintenance-free while others require a great deal of maintenance throughout their lives.
   SCALE:
   1 No maintenance required
   2 Low maintenance requirements
   3 Medium maintenance requirements
   4 High maintenance requirements
   5 Very high maintenance requirements

5. **Homogeneity** represents the number of other goods that are similar and are ready substitutes for the good under consideration. Typically, the more common the use of the good, the greater the amount of homogeneity. Highly homogeneous goods should be scored 1 and those with little or none scored 5.
   SCALE:
   1 Very high homogeneity
   2 High homogeneity
   3 Medium homogeneity
   4 Low homogeneity
   5 *No homogeneity*

6. **Consumption** refers to how rapidly the good is used by the buyer. Some goods are consumed on a continuing basis and require constant replenishment. Others are of a more permanent nature resulting in much less frequent buying. Rapidly consumed goods should be scored 1 and 5 used for goods that are rarely consumed or replaced.
   SCALE:
   1 Very rapidly consumed good, constant replenishment
   2 Rapidly consumed good, constant replenishment
   3 Moderate consumption and replenishment
   4 Low rate of consumption and replenishment
   5 Very low rate of consumption and replenishment

7. **Unit cost** is the good's cost to the buyer.
   Generally speaking, as a good becomes more
   unique to the buyer's requirement, the unit
   value is increasing. To score, use 1 for low
   unit cost and 5 for very high.
   SCALE:
   1 Very low unit cost
   2 Low unit cost
   3 Medium unit cost
   4 High unit cost
   5 Very high unit cost

8. **Documentation** is another characteristic external
   to the good yet many times a necessary part of
   it. Frequently the Government requires
   substantiating documentation in the form of
   drawings, technical manuals, and certifications
   for some types of goods while for others little
   at all is required. When scoring, a 1 would
   indicate a good purchased with no accompanying
   documentation while 5 is for goods accompanied
   by drawings, technical manuals, etc.
   SCALE:
   1 No associated documentation
   2 Low amount of documentation
   3 Medium amount of documentation
   4 Great deal of documentation
   5 Very high amount of documentation

9. **Item attention** given by the buyer refers to
   single-item versus volume or mass buying. When
   a buyer deals with small dollar-value items like
   common bolts and rivets, the focus is on a mass
   quantity of these types of goods. Contrast this
   with the acquisition of a F-14 aircraft where
   the buyer's attention is focused on a single
   item.
   SCALE:
   1 Complete volume-type attention
   2 Mostly volume-type attention
   3 Good that could be either volume or single
      item
   4 Good that is usually single-item attention
   5 Good that is always single-item attention

10. **Sources of supply** refers to the number of available sources that provide the same basic type of good. Some types of goods have associated with them a great number of alternate sources while others of a more specialized nature are more restrictive.
    SCALE:
    1   Virtually unlimited number of suppliers
    2   High number of suppliers
    3   Adequate number of suppliers
    4   One or two sources
    5   No sources exist

11. **Criticality** refers to the buying urgency associated with the good or the necessity of having the good available for the buyer to purchase. This characteristic of a good can be quite dynamic, but some goods, by their nature, may rarely be characterized as critical to the buyer.
    SCALE:
    1   Never characterized as a critical item
    2   Rarely a critical item
    3   Sometimes approached as critical
    4   Usually characterized as critical
    5   Always purchased under critical situations

12. **Stability** refers to the nature of the requirement. With some goods their demand is constant and seldom varies. On the other hand, demand for certain types of goods is much more volatile and uncertain depending on the need for the good and perhaps the technology that is available.
    SCALE:
    1   Good that is extremely stable
    2   High degree of stability
    3   Moderate amount of stability
    4   Low amount of stability
    5   Highly unstable good
    (Wenger, 1990, pp. 112-115)

A survey of 139 NCMA Fellows was then conducted to assess the relationship between the 12 characteristics and 21 sample goods. The goods within the sample ranged from

very simple to very complex. The 21 goods are listed in
Table 2-4.

The survey responses were then analyzed using
cluster analysis, and the 21 goods were divided into five
discrete clusters of relatively similar objects within the
clusters. In performing the cluster analysis, it became
evident that six of the 12 characteristics could be
eliminated.

> Along with an examination of the range of mean values
> for each of the 12 attributes, cluster analysis
> signalled the possible elimination of six attributes.
> While those attributes eliminated could describe the
> goods, their relative consistency across the various
> groups added little to the distinction between the
> goods. Because their consideration did not essentially
> add to the differentiation between clusters, retaining
> them merely caused a burden to the classification
> scoring process. (Lamm and Wenger, 1991, p. 244)

For a more detailed discussion of cluster analysis, see
Wenger, 1990. The six characteristics that were retained
are listed in Table 2-5.

In an effort to place goods along a continuum from
simple to complex, a grid was developed to reflect the
placement of a good within a category. A "+" was used to
symbolize a score that fell near the upper end of a
category, a "0" near the middle, and a "-" near the lower
end. (Lamm and Wenger, 1991, p. 246) Wenger's taxonomy
resulted in five categories of goods reflecting relatively

TABLE 2-4
SAMPLE GOODS

1. General Office Microcomputers
2. Fork Lift Trucks
3. Guided Missiles
4. Electronic Countermeasure Equipment
5. Paper Towel Dispenser
6. Pneumatic Chisel
7. Floating Drydock
8. 16MM Film Projector
9. Cold Food Counter
10. Submarine Periscopes
11. Filing Cabinet
12. Sandpaper
13. Aircraft Fire-Control Embedded Computer
14. Bottled Salad Dressing
15. Nuclear Reactors
16. Semi-conductor Assembly
17. Shipboard Washing Machine
18. Fluorescent Light Tubes
19. Pneumatic Tire (non-aircraft)
20. Micrometer (general purpose)
21. Flat washers

(Wenger, 1990, p. 44)

TABLE 2-5
CHARACTERISTICS RETAINED

1. Complexity
2. Customization
3. Maintainability
4. Unit Cost
5. Documentation
6. Item Attention

(Wenger, 1990, p. 85)

different characteristics between the categories. The

categories were labeled simple, basic, moderate, advanced,

and complex. (Wenger, 1990, p. 87)

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2. Validation of the Model

A subsequent study was conducted by Jack Prendergast in 1991 (Prendergast, 1991) to validate the Wenger taxonomical model. The basic concept was to apply the model to a buying organization within the Department of Defense (DoD) as recommended by Wenger. This study differed from the original in that the raw data to be used in the classification were collected from buyers of the goods rather than NCMA Fellows. The organizations chosen for data collection were the Navy Aviation Supply Office (ASO) in Philadelphia, Pennsylvania, and the Defense General Supply Center (DGSC) in Richmond, Virginia. These activities were selected because they have a large population of buyers and procure a diverse group of goods. (Prendergast, 1991, p. 33)

In selecting the items to be classified, Prendergast used the following guidelines:

1. The item would need to be fairly recognizable. Since the sole identifier for the respondent was nomenclature, the aim was to select items that would have name recognition for even the most casual observer.

2. The items chosen would be of an equipment nature vice a piece part nature. Again due to the use of nomenclature to identify the item to the buyers, it was felt that an item on the equipment level would be less likely to generate confusion. For instance, a propeller for the P-3 Orion aircraft would be more recognizable than a capacitor, which would come in a wide variety of sizes, shapes and capacities.

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3. The items to be surveyed would be a part of a homogeneous grouping, based on the organization of the activity selected.

4. The descriptions of the items to be classified were to be purposely generic to avoid creating an a priori bias in the way that the survey was presented. (Prendergast, 1991, p. 37)

It should be noted that what constituted a homogeneous grouping was unique to each activity. For example, ASO assigned buying responsibilities by end item application, while DGSC assigned workload by commodity. The items selected for classification at ASO were from the P-3 Orion anti-submarine warfare patrol aircraft. These goods are listed in Table 2-6. Two distinct homogeneous groups of goods were classified at DGSC in order to increase the number of items used to validate the model. The goods classified at DGSC, from the Food Service Equipment group and the Ship and Marine Equipment group, are listed in Table 2-7 and Table 2-8 respectively.

Prendergast applied the model using the same 12 characteristics as used by Wenger. Next, the model was streamlined through the removal of noncontributing characteristics, as indicated by cluster analysis. The streamlining process resulted in retention of the same six

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TABLE 2-6
ASO SURVEY ITEMS

1. Sonar Data Control
2. Fairing, Tailpipe
3. Flap Assembly
4. Entry Ladder Tread
5. Aileron
6. Lavatory Mirror Frame
7. Accelerometer, Mechanical
8. Computer, True Airspeed
9. Radio Beacon
10. Wing Tip Red Light Lens
11. Seat, Toilet, Plastic
12. Oven Assembly, P-3 Galley
13. Door Assembly, Right Hand, Bomb Bay
14. P-3 Galley Refrigerator
15. Propeller, Aircraft, Variable Pitch
16. Radome Boom Assembly, MAD
17. Feather Override Button
18. Wheel Assembly, Nose Landing Gear

(Prendergast, 1991, p. 39)

TABLE 2-7
DGSC FOOD SERVICE EQUIPMENT SURVEY ITEMS

1. Bread Slicing Machine
2. Fork, Field Mess
3. Dishwashing Machine
4. Ice Maker, Flake
5. Dispenser, Bulk Milk
6. Oven, Microwave, Electric
7. Kettle, Steam Jacketed, Electric, 60 Gal.
8. Ice Cream and Shake Maker-Soft Serve/Refrigerated
9. Meat Slicer, Electric
10. Stove, Gasoline Burner
11. Filter, Coffee Urn
12. Saw, Band, Meat Cutting
13. Steam Table
14. Refrigerator, Pre-Fabricated (Walk-in)
15. Rack, Dishwashing
16. Waffle Iron, Electric
17. Vegetable Peeler, Electric
18. Coffee Maker/Percolator

(Prendergast, 1991, p. 40)

TABLE 2-8
DGSC SHIP AND MARINE EQUIPMENT SURVEY ITEMS

1. Chair, Straight
2. Buoy Flag
3. Container, Trash
4. Ratguard, Ship
5. Tiedown Assembly
6. Anchor, Fluked, 750 Lbs.
7. Landing Ship Bow Ramp
8. Console, Ship Control
9. Propeller
10. Rudder
11. Seat, Toilet, Plastic
12. Door, Watertight
13. Anchor, Mushroom, 4000 Lbs.
14. Buoy, Navigational
15. Marker, Nun
16. Stanchion Assembly
17. Hatch Restraint
18. Cathodic Rod
19. Desk, Flat Top

(Prendergast, 1991, p. 41)

characteristics retained by Wenger, confirming the choice of

attributes to be removed. (Prendergast, 1991, p. 76)

However, as was noted:

> These characteristics are not absolute. Their validity
> has been shown once by Wenger, and then confirmed by the
> researcher. Future taxonomists should likewise continue
> to confirm that these attributes provide the best tools
> for classifying goods. (Prendergast, 1991, p. 91)

The validation study showed that goods procured by

the Federal Government can be classified according to their

inherent characteristics. The present study will examine

potential applications and benefits of the Wenger

taxonomical model.

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H. CHAPTER SUMMARY

This chapter has introduced the basic principles of classification, considered some existing classification schemes, and presented the events leading to the present study. The primary purpose of this chapter was to introduce the taxonomy developed by Wenger in 1990, for which potential applications and benefits will be examined. The next chapter will analyze the general usefulness of taxonomies and consider their role in the field of contracting.

III. TAXONOMICAL APPLICATIONS

A. INTRODUCTION

Before considering specific applications of the taxonomy of goods procured by the Federal Government, the theory behind classification, as well as some generic applications or uses of taxonomies, will be presented. Classification is rarely viewed as an end in and of itself. Classification systems are generally viewed as a means to improve the ability to interpret, predict, or control some facet of performance. (Fleishman and Quaintance, 1984, p. 44)

B. OBJECTIVES OF CLASSIFICATION

There are several basic objectives of classification in any discipline. The primary objective of classification is to describe the structure and relationships of constituent objects with regard to each other and similar objects. Classification simplifies these relationships in such a way that general statements can be made about classes of objects. In addition to simplifying relationships among objects, classification identifies boundaries between objects through differentiation. It is easy to observe structure when it is obvious and discontinuous. For example, horseshoe crabs are a unique species very different

from their nearest relatives. Classification is most useful

when the structure is less obvious. (Sokal, 1974, p. 1116)

In describing relationships among objects,

classifications should generate hypotheses. As stated by

Robert Sokal:

> In fact the principal scientific justification for
> establishing classifications is that they are heuristic
> (in the traditional meaning of this term as "stimulating
> interest as a means of furthering investigation") and
> that they lead to the stating of a hypothesis which can
> then be tested. A classification raises the question of
> how the perceived order has arisen, and in a system in
> which forces and relationships are transitory one may
> conjecture about the maintenance of the structure.
> (Sokal, 1974, p. 1117)

Another objective of classification is to achieve

economy of memory and facilitate communication. In

explaining how classificatory systems achieve economy of

memory, Fleishman and Quaintance provide that:

> The world is full of single cases: single entities of
> animal or plant species, single case histories of
> disease, single books or rocks. By grouping numerous
> individual objects into a taxon, the description of the
> taxon subsumes the individual descriptions of the
> objects contained within it. By saying that someone
> speaks Spanish, we imply that the individual's
> linguistic inventory resembles that of millions of other
> people in the taxon Spanish-speaking people, and we save
> ourselves a whole catalog of statements about the
> particular work lists and sentence structures familiar
> to the individual. (Fleishman and Quaintance, 1984, p.
> 24)

Without a clearer definition of boundaries, one cannot be

certain whether local dialects are included. However,

without the ability to summarize information and attach a

label to it, communication would be impossible. (Fleishman and Quaintance, 1984, p. 24)

Another objective of classification is ease of manipulation of information. Classification achieves ease of manipulation because the system consists of taxa that can be easily named and related to each other. If relationships are complex, labeling or handling of the taxa will not be easy. Therefore, ease of information retrieval is another objective of classification. (Sokal, 1974, p. 1116)

C. USEFULNESS OF TAXONOMICAL APPLICATIONS

In generic terms, the application of a taxonomy to a set of facts or objects results in adding more information to those facts or objects by revealing patterns, enabling predictions, and guiding various decisions. (Fleishman, 1982, p. 825) Classification can uncover important differences that may not otherwise be evident, or expose weaknesses in an existing knowledge base that require further investigation.

In describing the usefulness of a human performance taxonomy, Fleishman and Quaintance suggest that the taxonomy has important practical and scientific implications in a variety of fields. They further provide that a number of ostensibly disparate problems can be drawn together and viewed in a new light by the application of a taxonomy.

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They divide taxonomical uses into scientific-theoretical and applied-practical. The scientific-theoretical applications can be thought of as generic uses. That is, they can be useful in any discipline. Among the most important areas of usefulness are the following:

1. Conducting literature reviews.

2. Establishing better bases for conducting and reporting research studies to facilitate their comparison.

3. Standardizing methods of study.

4. Generalizing research to new tasks.

5. Exposing gaps in knowledge.

6. Assisting in theory development.
   (Fleishman and Quaintance, 1984, pp. 5-6)

A researcher's first encounter with classification takes place when conducting literature reviews to locate literature relevant to the research problem at hand. An element of the difficulty may be in matching descriptors in literature with the individual's own particular terminology. After completing the research, the same problems of semantics and measurement will be confronted in relating the results back to a body of knowledge. As mentioned earlier, a taxonomy eases the information retrieval process. (Fleishman and Quaintance, 1984, p. 5)

Another area of usefulness is in establishing better bases for conducting and reporting research studies to

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facilitate their comparison. A taxonomy is useful in disclosing the reasons why studies can or cannot be compared. Although a system may not be perfect, it will at least provide some guidelines for improving the conduct and reporting of research. (Fleishman and Quaintance, 1984, pp. 5-6)

A taxonomy is also useful in standardizing methods of study. A frequent problem in the experimental study of a discipline is the lack of standards and measures that make it possible to compare results of various research efforts. A taxonomy serves as the tool for standardizing, defining, and organizing the study. (Fleishman and Quaintance, 1984, p. 6)

Generalizing research to new tasks or situations is another area of usefulness for a taxonomy. A taxonomy assists in extrapolating previous research results to new areas of application. (Fleishman and Quaintance, 1984, p. 6) It essentially allows generalization of the knowledge of the effect of some training, environmental, or procedural condition from one set of circumstances to another, depending on the similarity or differences of the circumstances. (Fleishman, 1982, p. 821)

A taxonomy can also expose gaps in the body of knowledge of a discipline. By delineating categories of a field, a taxonomy reveals where extensive research has been done, and

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conversely, where it has not been done. (Fleishman and Quaintance, 1984, p. 6)

Finally, a taxonomy assists in theory development. The success of a theory depends on how well the theory can organize the observational data. An adequate taxonomy seems to be a prerequisite to the establishment of quantitative relationships. (Fleishman and Quaintance, 1984, p. 6)

A taxonomic system is essential for improving the ability to integrate existing knowledge in an efficient and effective manner and to generalize previously identified patterns to new settings and applications. (Pearlman, 1980, p. 1) Essentially, classification is a tool that provides guidance for appropriate procedures, methods, or rules. Classification enables sound predictions and allows comparison for evaluation and insight. Classification provides valuable support in the decision making process.

D. THE ROLE OF TAXONOMIES IN CONTRACTING

1. General Role

Taxonomies can achieve the same basic objectives in contracting as suggested above. The taxonomy of goods procured by the Federal Government could serve the overall role of advancing procurement research, which would in turn improve the procurement system.

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Since the Wenger taxonomy is based on the characteristics of goods deemed important in the buying process, it would provide insight into the structure and relationships of goods procured by the Federal Government from the perspective of the buying process. The taxonomy would enhance observation and clarify relationships among the goods. From this, general statements could be made about individual categories of goods which could help guide decisions in the procurement process. The differences identified between the goods in different categories, as well as the similarities between goods within each category, would provide valuable insight for decision making. And as suggested earlier, this process may be most useful when considering goods with less discernable differences than those between a five cent pencil and a billion dollar ship.

By describing relationships among goods, the taxonomy would result in hypotheses about the relationships. In turn, these hypotheses could be tested, providing explanations for the relationships and expanding the knowledge base.

The taxonomy of goods would also achieve economy of memory. This is not to suggest that buyers have a need to memorize the characteristics of goods in each category, but rather, a taxonomy would facilitate communication because it enhances the understanding of the goods and streamlines the

communication process. Each specific characteristic of a
buy need not be spelled out entirely, the category label
could summarize information instead.

A taxonomy of goods would also facilitate ease of
manipulation and retrieval of information in contracting.
This holds true from both a theoretical research standpoint
and a practical application standpoint. By classifying and
labeling categories of goods, the taxonomy provides a
framework for manipulation and retrieval of contracting
information. From the practical application perspective,
this provides an efficient means for operationalizing the
guidelines developed from the taxonomy. From the
perspective of procurement research, it facilitates
organized and systematic study.

Finally, the taxonomy of goods procured by the
Federal Government would achieve scientific-theoretical
usefulness. In much the same manner described in the
previous section, the taxonomy would serve procurement
research by enhancing literature reviews, establishing a
better base for conducting and reporting research studies to
facilitate their comparison, standardizing methods of study,
generalizing research results to new areas, exposing gaps in
knowledge, and assisting in theory development. All of
these would expand the body of knowledge in contracting.

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2. Specific Applications in Contracting

Based on the discussion presented thus far, potential areas for application of the taxonomy of goods procured by the Federal Government can be drawn. Potential areas where application of the Wenger taxonomical model could be useful are listed in Table 3-1.

TABLE 3-1
POTENTIAL APPLICATIONS OF THE TAXONOMY

1. Market Research
2. Policy Guidance
3. Training/Education
4. Staffing
5. Procurement Reviews
6. Budgeting
7. Legislative Development
8. Regulations/Procedures
9. Contract Type Selection
10. Contracting Method
11. Change Control
12. Break-out Decisions
13. Unsolicited Proposal Procedures
14. Industrial Base Decisions
15. Profit Guidelines
16. Source Selection Procedures
17. Administrative Procedures
18. Clause Selection
19. Specification Selection
20. Configuration Control
21. Independent Research and Development (IR&D) Policy
22. Acquisition Strategy
23. Workload Management

Source: Researcher's Analysis

As explained earlier, a detailed analysis and explanation of taxonomical applications will be limited to market research, procurement regulation, and

training/education. These applications will be presented in Chapters IV, V, and VI, respectively. For representation purposes however, several of the other most promising applications listed in Table 3-1 are synopsized below. The brief explanations provide an illustration of the potential benefits to be gained from implementation of the taxonomy.

a. Staffing

As suggested by Wenger, staffing levels for Government procurement offices could be determined by the type of goods bought by the office. In cases where an office buys a cross-section of goods, the office could be internally organized so that individual buyers are responsible for goods that exhibit the same characteristics. (Wenger, 1990, p. 19) But beyond staffing levels, several other aspects of the staffing process could be linked to the characteristics of the goods procured by an office.

The taxonomy could be used to link the necessary job qualifications and capacities measured in the selection process with the category of goods procured by the office. (Fleishman and Quaintance, 1984, p. 8) The seniority or skill levels required in various positions within the office could be linked in much the same manner. The type of positions required in an organization could also be linked to the category of goods procured.

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For example, an office procuring a category of goods characterized by a medium degree of homogeneity but few sources of supply may require market research skills in new employees. Or in the case where an office buys goods usually purchased under critical circumstances, contracting officers may need to be at a certain minimum level, having the experience to make on-the-spot decisions and the seniority to challenge the requiring office when the need arises. And finally, an office buying a category of goods with the characteristic of a large number of suppliers may not need the specialized position of a cost analyst since contract awards would tend to be based on price competition.

The benefit of application of the taxonomy in this area is the ability to tailor staffing aspects to the needs of the buying office, perhaps saving money and streamlining the procurement process.

b. *Procurement Management Review*

A taxonomy of goods could help guide decisions regarding several aspects of the procurement management review (PMR) process. If all goods were classified, observations of the taxonomy may suggest that offices procuring certain categories of goods should be reviewed more or less often than others. For example, an office that procures goods in the simple category may require less frequent review than an office procuring goods in the

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complex category. Perhaps the goods in the simple category would be characterized as rarely being critical, while goods in the complex category may have the characteristic of always being purchased under critical situations. These circumstances may indicate a decreased or increased likelihood of errors, which would call for less or more frequent PMRs for review and training purposes.

Another aspect of the PMR process that may be improved by implementation of the taxonomy is the content of the review. The taxonomy may reveal that some aspects of the review are more important than others, depending on the category of goods procured by the office being reviewed. For example, the PMR may be tailored to emphasize price analysis techniques for an office procuring goods characterized by a large number of suppliers, indicating the existence of price competition. Or defective pricing procedures may be emphasized for an office procuring a category of goods with the characteristic of having one or two sources, indicating that prices are set by negotiation rather than competition.

The taxonomy could also help shape the PMR teams themselves. The qualifications of the team members, as well as the seniority and numbers of team members to be utilized for a particular review, could be linked to the

characteristics of the category of goods procured by the
buying office.

Application of the taxonomy in this fashion
would provide the benefit of more efficient and effective
utilization of resources, both from the perspective of the
PMR team itself, and more importantly, from the perspective
of the organization subject to the PMR.

c. Acquisition Strategy

The Department of Defense defines acquisition
strategy as follows:

> A business and technical management approach designed to
> achieve program objectives within the resource
> constraints imposed. It is the framework for planning,
> directing, and managing a program. It provides a master
> schedule for research, development, test, production,
> fielding, and other activities essential for program
> success, and, is the basis for formulating functional
> plans and strategies (e.g., Test and Evaluation Master
> Plan, Acquisition Plan, competition, prototyping, etc.).
> (Defense Acquisition Management Policies and Procedures,
> 1991, p. 15-2)

As evidenced by this definition, acquisition strategy
encompasses many functional areas and many elements within
each area. Implementation of the taxonomy could improve
many aspects of the acquisition strategy development
process. Individual categories of goods could be examined
to see which elements or approaches are generally successful
in those categories. This information could guide managers
in the trade-offs that must be made in the strategy
development process.

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The acquisition strategy must address the degree of concurrency, or overlapping of activities, within the program. A trade-off must be made between the benefits and risks associated with reducing lead time through concurrency.

> The most common form of concurrency is the production of a system while developmental activities are still ongoing. The risk in such concurrency is that of producing a large number of units which might later prove to be unsuitable and must then be discarded, modified to be useful, or upgraded to production configuration. (<u>Defense Acquisition Management Policies and Procedures</u>, 1991, p. 5-A-4)

Implementation of the taxonomy may reveal that a particular category of goods has a very high degree of technical complexity, and therefore, the risk of concurrency is too great when compared with the benefits of a reduced lead time, and concurrency should be avoided. Another category of goods may be characterized by a medium degree of technical complexity, calling for greater use of concurrency.

Another element to be considered in the acquisition strategy is the design approach to be taken when requirements refinements are likely or when technology limitations prevent implementation of a required capability. Observations of a particular category may indicate that goods within that category have a very high amount of customization, and a modular design approach should be

taken. This observation would predict the likelihood that refinements in requirements will occur. Taking a modular approach to design would allow future refinements to be made and incorporated more quickly and at a lower cost

The taxonomy may reveal that another category of goods is characterized by a very high rate of technological change. These circumstances would suggest an acquisition strategy that calls for a preplanned product improvement approach.

> Preplanned product improvement is a phased approach that incrementally satisfies operational requirements in order to address the cost, risk, or relative time urgency of different elements of the system being developed. With this approach, selected capabilities are deferred so that the system can be fielded while the deferred element is developed in a parallel or subsequent effort. (Defense Acquisition Management Policies and Procedures, 1991, p. 5-A-5)

This approach allows future technological changes to be incorporated in an efficient manner.

There are many aspects of the acquisition strategy that stand to benefit from implementation of the taxonomy. These brief examples illustrate how the insights gained from the taxonomy could help guide trade-off decisions. The benefits of such a system are better tailoring of the acquisition strategy, with a higher probability of success, and a streamlined acquisition process.

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E. CHAPTER SUMMARY

This chapter has introduced the basic objectives of classification, described the usefulness of taxonomical applications, and suggested potential applications of the taxonomy of goods in the field of Government contracting. The next chapter will present a detailed examination of application of the taxonomy in the area of market research.

IV. APPLICATION: MARKET RESEARCH

A. INTRODUCTION

Perhaps one of the most beneficial applications of the taxonomical structure for classifying goods procured by the Federal Government is in the area of market research. Market research is an element of the acquisition planning process which has been overlooked in Government procurement. (Sherman, 1991, p. 120) Market research is an area where the taxonomical methods used in the discipline of marketing can be most directly extrapolated to the contracting field. This application of the taxonomy could help shore up a weakness in Government procurement, particularly in these times of declining budgets and a shrinking industrial base.

A discussion of market research in contracting will be presented first, followed by application of the taxonomy in market research. Finally, the benefits of the application will be discussed.

B. THE NEED FOR MARKET RESEARCH

Market research is most commonly associated with the field of marketing. In marketing, a distinction has been made between marketing research and market research.

Care should be taken to distinguish between marketing research and market research. Marketing research (or,

alternatively, scholarly research in marketing) always
seeks to expand the total knowledge base of marketing.
In general, market research attempts to solve a
particular company's marketing problem. (Hunt, 1983, p.
2)

Marketing research, or discipline research, refers to

research on the body of knowledge in marketing. It is

concerned with advancing the study of marketing. Market

research, however, can be thought of as a subset, element,

or type of marketing research. Contrary to the definition

cited above, research on the market not only solves a

particular company's marketing problem, but it can also

contribute to the body of marketing knowledge.

Similarly, market research in the field of contracting

can be viewed from two perspectives. From a macro view,

market research can advance the body of knowledge in

contracting and improve the procurement process by revealing

trends in the market that need to be reversed, or practices

that work better than others, or policies that enhance

competition in general. Research on the market will expand

the total knowledge base of contracting, and ultimately,

improve the process. Viewed from a micro perspective,

market research can be used to enhance competition or gain

an understanding of production processes for a specific

procurement.

Market research in the field of marketing is generally

concerned with research on the buyers of goods, or

customers. It can be seen as a means for a company to better serve customers. Market research in contracting is concerned with research on the producers or suppliers of goods and services in order to better serve the customers of the procurement process.

Customers of the Federal procurement process include tax payers who expect proper stewardship of their tax dollars, users of the goods or equipment whose lives may depend on the quality of the goods, and the suppliers of the goods. Suppliers are customers of the Federal procurement process in the sense that their viability is often dependent on actions taken by the Government. The Federal Government is often the only buyer, or one of few buyers, of the supplies they produce. As a monopsony, or oligopsony, the Government's actions strongly impact suppliers. Combine these circumstances with the Federal Government's sovereign powers to set procurement laws and regulations, and suppliers can be thought of as customers of the process.

Just as market research is a key element of marketing research, so should market research be a key element of procurement research.

C. MARKET RESEARCH IN CONTRACTING

Market research became a statutory requirement with the passage of the Competition in Contracting Act (CICA) of

1984. The Act specifically states: "In planning for the procurement of property or services, an executive agency shall...use advance procurement planning and market research...." (Stewart, 1987, p. 8)

There are two issues that arise with the mandate for market research. The first issue is that it is not clear what the scope of market research should be. The second issue is that the Federal workforce does not currently have the tools in place to carry out the mandate. As expressed by Stanley Sherman:

> In the case of market research, it is not clear that the federal work force is prepared in training and attitude toward the marketplace to carry out the mandate. While government procurement personnel have for many years given at least some attention to the subject of advanced procurement planning, there are no historical precedents for presuming that many of those currently employed in procurement are familiar with the concept of market research in an operational sense, that is, as a viable tool for securing information and assessing where to purchase their needs. (Sherman, 1991, p. 120)

The extent of Government market research in many cases has been limited to an announcement in the Commerce Business Daily (CBD) 45 days before bids or proposals are due to be submitted. This is evidence of the Government's need for improvement in the area of market research. It reflects a narrow interpretation of market research as consisting of a survey of existing Government sources. Further, "If any firm, large or small, finds out about a bid for the first

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time in the CBD, it is months or a year late in preparing to respond." (Stewart, 1987, p. 18)

Market research is intended to offer an opportunity to reduce barriers to competition by improving the information available to the contracting officer during the acquisition planning phase. The statute makes market research the central function in both achieving competition where possible and justifying the circumstances when it is not. (Mulhern, 1991, pp. 34-35)

In a study conducted by Richard Stewart in 1987 (Stewart, 1987), a definition of market research was developed, and the principal elements of an effective market research program were proposed by adapting marketing research procedures. The study presents both a narrow view and a broad view of market research pertaining to the Federal procurement process, and advocates adoption of the broad view.

> One, the narrow view, holds that the purpose of market research is merely to identify potential sources of supply. The other, the broad view, holds that market research involves far more than identification of potential sources of supply. In fact, the broad view is that the requirement involves understanding the market place and conducting the methodical research that is oftentimes necessary to develop that understanding. (Stewart, 1987, p. 9)

As such, Stewart defined market research as: "the collection and analysis of data to improve the quality of specific decisions which must be made within the existing

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framework of the procurement process." (Stewart, 1987, p. 34) This definition recognizes that there are many aspects of the procurement process that stand to be improved through market research.

In addressing the question of why the use of market research is a good idea, Stewart responded:

>...(b)ecause a knowledge of conditions in individual
>markets and the marketplace in general is essential to
>all facets of the Federal procurement process.
>Knowledge of who has supplied which products or services
>as well as who could supply them is needed to ensure all
>potential competitors have an opportunity to do business
>with the Federal Government. Knowledge of what is
>happening in the marketplace is a key ingredient in
>realizing fair and effective competition as well as
>arriving at a price that is fair and reasonable to both
>the buyer and the seller. One cannot hope to
>consciously set about to routinely purchase high quality
>products without the requisite knowledge about the state
>of the art in quality control processes, manufacturing
>processes, and management techniques.

>A contract negotiator should have knowledge of the
>factors affecting a particular industry such as prices
>of inputs (past and projected), transportation factors,
>state of the art inventory and production management
>systems, and innovations that may be just around the
>corner. It doesn't matter whether the negotiation
>involves a new type of missile, an individual repair
>part such as a valve, or consumable items such as paper
>clips. (Stewart, 1987, p. 16)

It is clear that a thorough market research capability developed within the Federal procurement system would substantially strengthen the ability of the Government to use and enhance the purchasing process more effectively, including, but not limited to, generating competition (Sherman, 1991, p. 121).

Beyond consideration of what market research encompasses, Stewart delineated five principal elements of an effective market research program. These elements, listed below, were developed based on an analysis of literature and observations of both Government and private industry practices.

1. Criteria for Project Selection

2. Proper Research and Analysis Skills

3. A Methodical Approach

4. Timely Information

5. Effective Communication of Findings
   (Stewart, 1987, p. 40)

The first element, criteria for project selection, recognizes that the most efficient use of limited resources must be achieved. Therefore, an effective market research program must establish a process for selection of projects to be pursued. (Stewart, 1987, p. 40)

The second element, proper research and analysis skills, refers to the need for trained personnel applying the proper techniques or tools. It is a waste of resources to gather a great deal of potentially useful data and then fail to apply the requisite skills to analyze and interpret its meaning. (Stewart, 1987, p. 41)

A methodical approach requires an organized and systematic undertaking in order to prevent duplicating

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efforts or missing important information. A scientific approach must be taken to ensure the research procedures are applied in a consistent and organized manner. (Stewart, 1987, p. 42)

Timely information is an important element, and without it, all efforts to this point will have been wasted. Timely information is necessary to assimilate the results of the research in acquisition planning. If market research must start from the beginning each time information is required, it will probably be completed too late to be used in the procurement. (Stewart, 1987, p. 43) However, if the information is organized and general principles have been developed, the buyer need only determine which principles apply to the present situation.

With regard to the fifth element, effective communication of findings, an effective market research program must have a means of getting the right information to those who need it. In order to be effective, the information provided must be in a form that is understandable and useful to the recipient. (Stewart, 1987, p. 43)

The principal elements of an effective market research program will be called out again in application of the taxonomy in the next section of this chapter. With regard to market research, it is clear that the Federal Government

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has not aggressively pursued its use. It is also evident that an effective market research program holds great potential for improving the Federal procurement process in many ways.

D. APPLICATION OF THE TAXONOMY IN MARKET RESEARCH

Implementation of the taxonomy of goods procured by the Federal Government would facilitate market research in several respects. Market research results could then be used at two different levels. First, the taxonomy would enhance market research because it would serve as the framework for conducting organized and systematic research of the overall market, revealing trends or problem areas, or ways to improve the procurement process, advancing the body of knowledge. Second, the taxonomy could be used to provide logical access to market information for use in a specific procurement.

To be effective, the taxonomy would first be operationalized, with all goods procured by the Federal Government classified, then the classification scheme could serve as the basis for organizing market research. In other words, research on the market could be done on a category-by-category basis, providing an organizational framework for systematic study. Elements of the scientific-theoretical usefulness of the taxonomy described in Chapter III would be

applied in market research. If market research were conducted along the lines of the categories of the taxonomy, literature reviews would be made easier because information on the market could be accessed by the category to which an item belongs. The categories would serve as the bases for conducting and reporting research studies to facilitate their comparison. Observations of goods within individual categories may be generalized to other goods in the same categories. For example, suppose that personal computers and ship positioning computers were both identified to the advanced category of goods. Perhaps goods in this category would be characterized by a high degree of maintenance. Observations of the successful warranty terms or maintenance contracts used in the more commonly procured personal computers could be generalized and used when buying the less frequently purchased positioning computers.

Areas where greater research is needed may be exposed. At the present time, there is no framework consistently used throughout Federal procurement for the accumulation and storage of market research. Adoption of the taxonomy would provide a consistent approach for accumulation of information on the market.

As discussed earlier, Stewart identified five principal elements of an effective market research program. The taxonomy would facilitate several of these elements.

The first element, criteria for project selection, would be enhanced by the taxonomy because one of the criteria for project selection should be simply whether or not there is any existing information available on the project at hand. For example, say a buyer has a requirement for a pneumatic valve. Before initiating a market research project, the buyer could access a data base of existing market research by the category of the valve, perhaps moderate, to see if there is any existing market research information already available. If so, the information could be used, and no new project would be required. If not, a market research project may be initiated. The taxonomy would provide a means for searching for, and utilizing, existing information, or confirming that none exists.

Another element of an effective market research program is a methodical approach. The taxonomy would provide the structure for a methodical approach to market research. Market research could begin with the simple or complex category, or any category between the two. Research could be conducted on that category on a regular and continuous basis, methodically building the knowledge base. Framing market research in this manner would prevent duplicating efforts or missing important information. The taxonomy, as a scientific method, would guide market research in a consistent and organized fashion.

The requirement of timely information would also be enhanced by implementation of the taxonomy. Market research information would be provided in a more timely way because the taxonomy would allow cataloging of the information. If a buyer needs information on a moderate good, perhaps a galley oven, information could be quickly retrieved by reviewing the data base accumulated under the heading of the moderate category. This would allow quick information retrieval, and prevent having to start at the beginning with each market research project.

Finally, the effective communication of findings would be simplified by the taxonomy. Again, this is a function of indexing market research along the categories of goods. This would provide those who need the information an effective access mechanism to the information. Organizing market research around the taxonomy would allow findings to be related back to the body of knowledge in the same manner, encouraging more effective communication of findings.

Once the taxonomy is in place, market research would be conducted and indexed by the individual categories of the taxonomy. Perhaps a data base could be developed for easy access to existing information and relaying new information back into the system.

From the macro perspective, market research framed by the taxonomy may reveal certain categories of goods that are

particularly well-suited for procurement from small business, which should then be targeted as such. On the other hand, market research performed along the lines of the taxonomy may reveal a category of goods where there is little small business participation. Market research could then be initiated to identify and remove the barriers to small business participation. Principles discovered in studying categories where small business participation is exemplary could be emulated in areas where there has been little success.

For example, suppose market research conducted along the framework of the taxonomy reveals that there is a large number of small businesses succeeding in the advanced category of goods, but few in the less complex moderate category. It may seem unusual that small businesses are succeeding in the more complex category rather than the simpler category. Study could then be conducted to determine the reasons for the difference. Perhaps the difference is that in the advanced category, goods are characterized by a higher degree of technical complexity than the moderate category, but less capital investment is required. It may be discovered that small businesses are very skilled technically, but they do not have access to capital for the equipment required for goods in the moderate category. A concerted effort could then be made to provide

access to capital for small businesses in order to succeed in the moderate category of goods. In this manner, market research would be used to expand the body of knowledge in contracting.

Organizing market research in relation to the taxonomy may force recognition of characteristics shared by goods from seemingly different industries for comparative purposes. From the perspective of an individual procurement, or micro view, the taxonomy could provide access to market research information based on the category of the item being procured.

For example, a particular procurement may appear unique, with only one contractor capable of responding to the need. Since goods would be classified according to inherent characteristics deemed important in the buying process, rather than physical characteristics, the taxonomy may provide insights not otherwise considered. Based on the category to which the item being procured belongs, market research centered around the taxonomy may reveal other companies that are capable of manufacturing the item. In Prendergast's study, both the propeller and the accelerometer were identified to the advanced category. These two goods may not normally be considered as belonging to the same category of goods, but the taxonomy revealed they should be. There may be lessons to be learned from

buying propellers that could be useful, but not otherwise considered, when buying accelerometers. Market research conducted along the framework of the taxonomy may show that products previously considered different actually share certain characteristics in common.

In addition to enhancing market competition, market research conducted in the fashion described above would also provide access to information required for individual negotiations. This information may include the state of technological change, manufacturing processes, warranty practices, and factors affecting prices.

For an organization buying bulk items, such as fuels, market research in this manner may reveal lower priced product substitutes such as another grade or type of fuel. Market research organized in this way may provide quick access to price trends so that an organization can time their buys accordingly, such as making a large bulk purchase instead of a series of small buys as prices are increasing. It may identify goods in markets which are likely to be volatile, or indicate the likelihood of strong or weak commercial demand for the goods, assisting in procurement planning.

E. BENEFITS OF THE TAXONOMY IN MARKET RESEARCH

Implementation of the taxonomy of goods would provide several benefits in the area of market research. In addition to identifying sources of supply by individual category to enhance competition, it could also serve as the framework for conducting methodical research, and enhance understanding of the market. The taxonomy would be a tool used by the procurement workforce that would make market research a viable process. It would be useful regardless of whether the narrow or broad view of market research were adopted.

The taxonomy would facilitate the conduct of market research through the cataloging of results for future use. This would improve the quality of specific decisions made within the procurement process. Ultimately, it would result in a more efficient use of tax dollars, enhance the ability of the procurement process to provide quality products to users, and improve decisions affecting suppliers.

F. CHAPTER SUMMARY

This chapter has presented the issues in market research, and discussed how the market research process may be improved in contracting through implementation of the taxonomy of goods procured by the Federal Government. The

next chapter will examine application of the taxonomy in the area of procurement regulation.

V. APPLICATION: PROCUREMENT REGULATION

A. INTRODUCTION

Another significant application of the taxonomy of goods procured by the Federal Government is in helping to guide decisions with respect to procurement policies, procedures, laws, and regulations. As expressed by Wenger: "After classifying enough goods, patterns or trends may result that will allow for additional streamlining of policies and procedures for certain categories." (Wenger, 1990, p. 90) Prendergast elaborated that:

> Results of a classification scheme can be used to assist in the formulation of contracting laws, regulations and procedures. Certain groups of items can be singled out for greater or lesser regulatory attention based on their characteristics as determined by the taxonomic scheme. (Prendergast, 1991, pp. 87-88)

Some of the problems and inefficiencies associated with the procurement regulation process will first be presented. A discussion of how the taxonomy could be applied in procurement regulation will follow. Finally, the benefits of the application will be considered.

B. PROCUREMENT REGULATION

Within the field of Government contracting, Robert Judson's profile of the acquisition environment (Judson, 1986), serves as the basis for these promising taxonomical

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applications. As Judson stated in the 1986 profile: "Often, critics of the acquisition process assume that the characteristics of purchasing ordinary consumer goods can be readily transferred to the acquisition of unique systems." (Judson, 1986, p. 14) In his article, Judson provided a comparison of the characteristics of ordinary consumer goods to the characteristics of unique products. Judson went on to say that:

> It is the author's hope that this profile will suggest restraint, in some small way, in the mad dash to legislate and regulate the acquisition of uncertain products as if such undertakings were simple variations of the consumer purchasing process and only need to be pressed by law and regulation into that familiar mold. (Judson, 1986, p. 14)

The obvious implication is that buying commercial, perhaps simple, items at one end of the spectrum is a different process than buying uncertain, perhaps complex, items at the other end of the spectrum. These differences should be recognized not only in procurement laws and regulations, but in policies and procedures as well. These separate areas of application are distinct, however they do share the common threads of shaping and guiding the procurement process, some more rigidly than others. As such, the logic underlying the usefulness of the taxonomy is similar, as are the benefits, in all of these areas. These areas will be collectively referred to as regulation.

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The Judson profile suggests that regulations are being written for unique items, such as major weapon systems, as if they were simple commercial items, and that restraint should be exercised in writing new laws and regulations for such items. This idea can be taken a step further. There are laws and regulations in existence that have been written with the purchase of complex items in mind that needlessly apply to the purchase of simple items, creating an unnecessary administrative burden.

In a survey conducted in 1992 of 12 companies that do both Government and commercial business, it was determined that the Department of Defense (DoD) pays a premium of 30 to 50 percent more for products than the same or similar items sold to commercial businesses. The survey identified the additional cost of commercial products when applying unique laws required to provide the products to the DoD vice commercial enterprises, and conversely, commercial product cost savings that would result from elimination of restrictive DoD laws regulating the defense industry. (Krikorian, 1992, p. 12)

As further evidence of the burdensome procurement system now in place, a study conducted in 1987 (Lamm, 1987), concluded that two of the four principal reasons companies refuse Defense business related to burdensome paperwork and inflexible procurement policies. (Lamm, 1987, p. 88)

It is evident that the acquisition process needs to be streamlined. A system that would enable prudent tailoring of the regulation process would provide great benefits.

C. APPLICATION OF THE TAXONOMY IN PROCUREMENT REGULATION

Implementation of the taxonomy of goods would reveal areas where regulation could be streamlined or tailored. The information the taxonomy would provide could guide and support the decision making process. The classification scheme could be used to formulate new regulation and revise existing regulation. And as suggested by Prendergast, the taxonomy could also be used to selectively apply regulation or identify categories where greater or lesser regulatory attention is required.

From the viewpoint of Judson's profile of the acquisition environment, a major weapon system procurement would benefit by relief from regulations written from the perspective of buying simple commercial items. It seems fair to say that the process of procuring a complex major weapon system requires different considerations, and more flexibility, than buying a simple commercial item.

On the other hand, requiring all of the unique considerations, processes, specifications, financial systems, procedures, and so forth normally required for complex major weapon systems for the procurement of simple

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commercial items undoubtedly adds cost and time to the procurement process.

The taxonomy of goods procured by the Federal Government could prove to be a very useful tool in shaping procurement regulation. If all goods were identified to their respective categories, ranging from simple to complex, regulation could be tailored and applied to individual categories. The possibilities of such a system are most apparent when comparing the extreme categories of simple and complex goods. However, refinements could also be made between the middle categories which, when applied Government-wide, would be extremely beneficial.

By viewing goods that the Government buys in separate categories rather than as one large homogeneous group, a relationship between the characteristics of the products within each category and appropriate regulation could be determined. Refinements could be made between individual categories as well as within the extreme ends of the simple-to-complex scale.

For example, at the complex range of goods, such as major weapon systems, two programs may be classified as acquisition category I programs because of the dollar value of the programs. As such, the two programs would be subject to the same regulation. The taxonomy may reveal that the goods procured in one program belong in the advanced

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category rather than the complex category, thereby allowing some relief or additional streamlining of the acquisition process. A possible scenario for this would be a major non-developmental item (NDI) program compared to a major research and development program.

Within a single major weapon system, some of the items procured may be complex, while the taxonomy may indicate that other items within the program are more appropriately classified as simple, basic, or moderate, allowing for less regulatory control.

1. Tailoring Regulation

In these times of declining budgets in the defense industry, the Government must pay close attention to the defense industrial base. An argument can be made that a comprehensive defense industrial base policy should be established. Within the context of major weapon systems acquisition, the defense industrial base policy is addressed as follows:

> The industrial base implications of proposed defense acquisition program peacetime, surge, and mobilization objectives, to include conflicts with other DoD programs, shall be addressed at each milestone decision point.

> Program planning shall include procedures to identify and minimize the potential impact of foreign dependencies and diminishing manufacturing sources and material shortages on production and support objectives. (Defense Acquisition Management Policies and Procedures, 1991, p. 5-E-1)

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This policy addresses industrial base issues from the perspective of the individual program at hand, how to ensure the individual program's success. It does not, however, address the overall issue of what must be done to maintain essential manufacturing capabilities that may be diminishing.

The taxonomy of goods procured by the Federal Government could help shape and implement a comprehensive industrial base policy. It is outside the scope of this study to argue whether that policy should be to let market forces take their course, or whether the Government should play a proactive role in managing the industrial base, or whether the Government should play the role of helping firms transition from defense to commercial markets. However, the taxonomy could help to tailor and implement an industrial base policy.

To begin with, implementation of the taxonomy could highlight the category or categories of goods where there are few sources of supply, perhaps a key link to the industrial base. It may show that there is a high degree of homogeneity in all but one of these categories, suggesting that concern for a diminishing industrial base need only be directed towards a single category. Or perhaps, although there are few producers in a particular category, the number of goods in the category is few, with no anticipation of

increasing needs. These circumstances may lead to adoption of a policy that allows market forces to take their course.

Another possibility is that the taxonomy reveals categories characterized by different degrees of customization. Customization may be a key link to the industrial base. Goods with little customization seem likely to be commercial goods, which translates to alternate markets for companies. If there is little customization in three of the categories of goods, it may indicate that these categories have strong commercial markets, meaning there is no need for concern with the industrial base in these categories. A fourth category of goods may have a medium amount of customization, but many sources of supply, again indicating little need *for concern* with industrial base policy since there are many sources. However, the fifth category of goods may be made exclusively for the Government. In this case, the Government's industrial base policy may be to take a hands-off approach towards the first four categories. For the fifth category, the Government may need to take definite actions to maintain an essential industrial capability.

As a way of assisting firms that make that fifth category of goods, actions that would assist the industry could be linked to that category of goods, providing for concentrated, efficient action. For example, in order to

strengthen firms making this category of goods, the

Government may decide to liberalize independent research and

development (IR&D) funding and link it to commercial product

development, specifically for firms making this category of

goods, thereby helping to maintain their strength.

An example of the concept of linking research funding to

commercial product development is the Small Business

Innovative Research (SBIR) program.

> The purpose of the SBIR Program is to stimulate
> technological innovation by small businesses and to
> increase private sector commercialization of innovations
> derived from federal research and development....More
> than 18,000 SBIR awards have been made totaling some
> $2.3 billion. A GAO study indicates that more than 25
> percent of these awards have resulted in
> commercialization of products or services. (Weaver,
> 1992, p. 28)

Under legislation being developed, SBIR program funding

would have a stronger link to commercial product

possibilities. An important consideration in the evaluation

for funding will be based on the applicant's plans to market

the product commercially. (Gupta and Saddler, 1992, p. B2)

In this scenario, funding is linked through the SBIR

program. The taxonomy would allow this concept to be linked

to the category of goods where it is most needed, rather

than across the board, thereby maximizing the benefits of

limited resources.

Another situation may be that market research done

on this category of goods has revealed impediments to

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business operations such as profit considerations focused too heavily on capital equipment investment, or excessive use of design specifications. A concerted effort could be directed towards manufacturers of this category of goods to improve the circumstances. Perhaps unique considerations must be made in determining profit objectives, such as shifting emphasis from capital equipment investment to commercialization potential, or a special emphasis on eliminating design specifications, which tend to inhibit innovation and create inefficiency, could be made particularly in this category to improve performance. Perhaps this category of goods may be targeted for multiyear contracting. In essence, the Government could develop and tailor policies taking into account information revealed from implementation of the taxonomy.

2. Selective Application of Regulation

Implementation of the taxonomy of goods could provide a more sound framework for selectively applying regulation. In many cases now, regulation is either applied across all procurement or linked artificially to selected dollar values. Take for example small purchase procedures. These procedures are presently limited to procurements under 25 thousand dollars. It may be more logical to link small purchase procedures to the characteristics of the goods rather than dollar value. For example, the practice of

allowing oral solicitations can be more logically linked to the characteristics of the goods, such as customization or sources of supply, rather than the dollar value of the procurement. Oral solicitations would be called for when an item is not customized, because there would be no need for detailed specifications, and there would probably be a commercial market for the item. This combined with many sources of supply would indicate that market forces set a fair and reasonable price for the item. Allowing oral solicitations where appropriate based on the characteristics fo the goods would save the time and cost of creating formal written solicitations.

Small purchase procedures are basically designed to streamline the procurement process, reduce administrative burden, and promote efficient and economical practices. Small purchase procedures balance the need for control with efficiency and low administrative costs.

Perhaps these procedures should be linked with inherent characteristics of goods deemed important in the procurement process rather than an artificial dollar value. The success of these procedures could more logically be linked to the level of complexity, customization, documentation, or item attention rather than the dollar value. As such, the practice of using these procedures, procedures like them, or suspending various requirements

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would be more appropriately tied to the category of goods (i.e., the characteristics of the goods) rather than dollar value.

The taxonomy could identify the category or categories of goods that have the characteristics which lend themselves to streamlined procurement procedures. Perhaps instead of calling them small purchase procedures and linking them to an arbitrary dollar value, the practices should be called streamlined procurement procedures, and linked to the characteristics deemed important in the buying process. These procedures could then be selectively applied to those categories of goods that display these characteristics. This process would provide a more logical method of linking streamlined procedures, and may expand applicability of the procedures to a wider range of goods.

D. BENEFITS OF THE TAXONOMY IN PROCUREMENT REGULATION

The benefits of implementing the taxonomy of goods procured by the Federal Government could be significant. The taxonomy would provide a framework for tailoring and selectively applying procurement regulation. It would not only be useful in shaping new regulation, but the taxonomy could also serve as the basis for rethinking existing regulation.

The advantage of this scheme would be a streamlined process that would make the system more timely and responsive. It would allow for a more efficient system free from needless or inappropriate regulation. The classification scheme could help eliminate the 30 to 50 percent premium that the Government pays on commercial, perhaps simple, goods. By streamlining the procurement process in this fashion, the Government could save significant amounts of time and money through reduced administrative and oversight burdens.

While the discussion to this point has considered laws, regulations, policies, and procedures collectively, the taxonomy could be used to varying degrees in these separate areas. It is likely that Congress would be hesitant to tailor legislation or build in flexibility, perhaps giving up some degree of control and influence. However, the taxonomy could help shape DoD input into the legislative process, influencing it to some extent. With regard to the other areas of application, DoD would have greater control over the process.

E. CHAPTER SUMMARY

This chapter has presented issues in procurement regulation, and discussed how the process may be improved through implementation of the taxonomy of goods procured by

the Federal Government. The next chapter will examine
application of the taxonomy in the area of contracting
training and education.

VI. APPLICATION: PROCUREMENT TRAINING AND EDUCATION

A. INTRODUCTION

"A strong and viable training and educational program is fundamental to strengthening the DoD's acquisition process." (The Acquisition Enhancement Program Report II, 1986, p.59) As expressed by one of the contracting experts interviewed for this research in discussing application of the taxonomy of goods procured by the Federal Government in the area of procurement training and education: "Perhaps it is my perspective in business, but I feel that this is the best or most useful application."

Training and education can play a key role in improving the procurement workforce. Presently, training systems are very fragmented and diffused. Training and education need to be taken more seriously and managed coherently. (Mavroules, 1991, p. 19) The taxonomy may be the tool to manage the process coherently.

A brief snapshot of current training and education problems will be presented first, followed by a discussion of how implementation of the taxonomy could improve the training and education system. The benefits of the application will then be presented. The focus of this

chapter is primarily on procurement training, but the same

general concepts discussed apply to education as well.

B. PROCUREMENT TRAINING AND EDUCATION

As pointed out in the Packard Commission report:

> The defense acquisition workforce mingles civilian and
> military expertise in numerous disciplines for
> management and staffing of the world's largest
> procurement organization. Each year billions of dollars
> are spent more or less efficiently, based on the
> competence and experience of these personnel. Yet,
> compared to its industry counterparts, this workforce is
> undertrained, underpaid, and inexperienced. Whatever
> other changes may be made, it is vitally important to
> enhance the quality of the defense acquisition
> workforce--both by attracting qualified new personnel
> and by improving the training and motivation of current
> personnel. (A Quest for Excellence, 1986, pp. 66-67)

As indicated by this statement, improving procurement

training is an essential element in improving the

acquisition workforce. Innovative methods of improving

procurement training would have a significant impact on

improving the efficiency and effectiveness of the

procurement process. Although the Packard report

specifically addressed DoD practices, the problems

identified and the solutions recommended apply equally well

to the entire Federal procurement system.

In discussing the DoD acquisition workforce, the

Acquisition Enhancement follow-on study (ACE II) reported

that:

> The training requirement confronting DoD is beyond the
> capability of any service or agency acting

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independently. A coordination effort, using all available resources, crossing service and agency lines, is required. (_The Acquisition Enhancement Program Report II_, 1986, p.19)

The magnitude of the challenge includes approximately 56,000 civilian and military personnel, with a training backlog of approximately 2,000,000 man-days. (_The Acquisition Enhancement Program Report II_, 1986, p.19) These numbers indicate the significance of the training challenge faced by the DoD alone. The figures would escalate if the entire Federal procurement workforce was factored in the equation.

Procurement training lacks the necessary direction, planning, coordination, and accountability to make the training base efficient and effective. Problems include large training backlogs, inadequate resources, and courses with limited competency and skill development. (_The Acquisition Enhancement Program Report II_, 1986, p.59)

The ACE II study identified problems that affect the efficiency of the DoD training base for contracting. The first problem identified was that:

Virtually no capability exists to determine the size, composition, trends, and training requirements of the work force. (_The Acquisition Enhancement Program Report II_, 1986, p.61)

Acquisition training and education is an important aspect of the Defense Acquisition Workforce Improvement Act (DAWIA). Among other elements, a primary emphasis of the DAWIA is on increased training and education. "The

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secretary of defense is to establish education, training, and experience requirements based on the *level of complexity of the duties carried out* in the position." (Edgar, 1991, p. 52) (emphasis added)

The discussion thus far highlights the potential gains that can be made through innovative techniques used in the training system. The potential rewards are significant, both in efficiency and effectiveness. (The Acquisition Enhancement Program Report II, 1986, p.76).

With the passage of DAWIA, steps are being taken to improve the training and education process. The appointment of a director of acquisition career management (DACM) for each of the Services provides for centralized management of the acquisition training and education program. While the Government in general, and the DoD specifically, have recognized the need for better procurement training and education, more needs to be done. A creative approach such as applying the taxonomy of goods could provide valuable insights in improving the process.

C.   APPLICATION OF THE TAXONOMY IN PROCUREMENT TRAINING

When many thousands of people must make contracting decisions, and wrong decisions can cost billions, the need for better procurement training is overwhelming. "We need better curriculum research technologies to match remedies to

troubles." (Crawford, Siegel, and Kerr, 1990, p. 55) The taxonomy could be that innovative tool for matching remedies to troubles.

The first problem encountered in developing training courses is obtaining sufficient task-descriptive data in a form that will permit the appropriate design and conduct of training. The procedures the person is expected to follow, the equipment and tools required, and the conditions of the job must be identified. (Fleishman and Quaintance, 1984, p. 8).

The taxonomy could be the tool needed to obtain task-descriptive data in a form that will permit the appropriate design and conduct of training. The taxonomy could be used to improve procurement training and education by linking and prioritizing the skills that are important in buying specific categories of goods. The procedures the person is expected to follow, the competencies required, and the conditions of the job can be more accurately identified, and training could then be more accurately tailored to the student's needs.

The taxonomy would first identify the different categories of goods. Following classification, the individual categories would be studied to identify the specific competencies required in procuring those goods. These competencies encompass two aspects, both the task or

skill itself, and the degree of skill required in performing the task. For example, one buyer may perform cost analysis occasionally on a relatively simple level, while another may be required to perform relatively complex cost analysis on a regular basis. Both need cost analysis skills, but at different competency levels.

The Federal Acquisition Institute identified the goal of training in contract management as follows:

> With respect to newly hired Contract Specialists, the primary goal of training is competence at performing specific duties and tasks. Hence, the Federal Acquisition Institute (FAI) has identified 51 competencies for Federal Contract Specialists (GS-1102). A competency, by definition, is the ability to perform a duty and its related tasks. The goal of competency-based training is therefore to (1) provide the knowledge necessary for competent performance and (2) provide an opportunity to apply that knowledge through practice in performing the duty. (Contract Management Training Blueprints, 1989, p. viii)

The FAI developed training blueprints for people who design and deliver training in any form to include staff instructors at Federal procurement training facilities, college and university instructors of academic-level procurement courses, and procurement training contractors. However, the training blueprints are not classification guides and have no relationship to the grade levels of trainees (some trainees will need instructions in a competency at the GS-5 level, while others may not need such instruction until the GS-11 level). The training blueprints

are laid out to roughly map the procurement process.
(<u>Contract Management Training Blueprints</u>, 1989, p. viii)

An important insight that the taxonomy could provide
that is not otherwise evident today is the combination of
skills, and the level, appropriate for a given training
course. As stated by one of the contracting experts
interviewed:

> In the procurement training programs I have conducted,
> classes have been comprised of people from entry level
> to senior management, and from (tenth) grade education
> to doctorate level, and from new hires to long-timers on
> the verge of retirement. It is very challenging to
> teach such a class. The taxonomy could help trainers to
> classify the material more suitably to the student's job
> assignment.

If all Government goods were classified into the five
categories proposed in Wenger's taxonomy, the resulting
categories may reflect any number of combinations and
scalings of the characteristics. It would be impossible to
elaborate on the many possible combinations that could
result, however, a look at the some of the individual
characteristics may help demonstrate the insights that may
be gained from the taxonomy.

The first characteristic to consider is change. The
opposite ends of the scale for change are very low rate of
technological change and very high rate of technological
change. An examination of the degree of change, and the
resulting implications, in the category of goods that the

buyer purchases would allow tailoring of the training provided to that person, and others who procure the same category of goods. For example, goods with a very low rate of technological change may belong to the simple category. A very low rate of technological change could indicate that competency in contract changes is a low priority. On the other hand, goods with a very high rate of technological change, possibly the complex category, may call for a high priority in contract modification, configuration change management, equitable adjustment pricing techniques, and market research skills.

Continuing with this example, the customization characteristic in the simple category of goods may be scaled as no amount of customization, and the complex category may be scaled as made exclusively for the Government. The scale of no amount of customization may indicate that buyers do not need skills in the proper selection of specifications. This customization scale may suggest goods which are now thought of as commercial products. Indirectly, this may imply a low priority on cost analysis skills, formal source selection planning skills, and negotiation skills since the buyers would likely be dealing with price competition. The other end of the customization scale, made exclusively for the Government, would call for a high degree of competency in these skills.

The taxonomy could link necessary skills with the category of goods procured by the individual. Training could then be tailored to address the student's most important needs.

D. BENEFITS OF THE TAXONOMY IN PROCUREMENT TRAINING

It is not suggested that the taxonomy of goods is the cure-all for procurement training and education problems. It will not magically eliminate training backlogs and increase resources. However, the tailored training approach encouraged by the taxonomy would enhance competency and skill development and provide task-descriptive data for designing courses. The taxonomy may allow better utilization of available resources. As expressed by one contracting expert: "This proposed classification could assist educators in developing more application oriented educational exercises and simulations." Case studies used in teaching could be closely tailored to the students' own situations. Innovative techniques such as the taxonomy, which assess the complexity of goods, are important in giving the issue more visibility.

The taxonomy addresses directly the need to establish training and education requirements based on the level of complexity of the duties carried out by individuals. And as pointed out by one of the contracting experts interviewed

for this research: "It might also suggest the need for training in areas not now covered by the more or less standard menu of courses offered."

The level and combination of skills needed in job performance, as identified by the taxonomy, could be used, perhaps in conjunction with the FAI training blueprints, to develop a more effective and efficient Federal procurement training system. Viewing the spectrum of goods in this manner would allow procurement training to be tailored directly to the needs of the buyers. It provides a means for prioritizing training needs in order to get the maximum benefit from the limited resources that are available. The ultimate benefit would be a better trained procurement workforce, which could result in billions of dollars of savings.

E. CHAPTER SUMMARY

This chapter has presented the magnitude of the training and education challenge facing the Federal Government, and described how the system may be improved by application of the taxonomy of goods procured by the Federal Government. The next chapter will present the conclusions of this research effort and provide suggested areas of future research.

VII. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

This chapter will present the conclusions and recommendations resulting from this research effort, answer the primary and subsidiary research questions, and recommend areas for further research.

B. CONCLUSIONS

The following conclusions have been drawn from the research conducted in this study:

1. **The taxonomy of goods procured by the Federal Government meets the criterion of being useful.**

The results of this study validate the requirement that the taxonomy be useful. This research effort identified areas of application for the taxonomy and demonstrated how the model would be useful. The taxonomy is a tool that can be used to guide and assist the procurement decision making process. It provides strategic insights not otherwise available.

2. **The taxonomy of goods procured by the Federal Government could streamline the procurement process and reduce administrative burden.**

The primary benefit of the taxonomy is the ability to tailor different aspects of the procurement process to individual categories. This would allow the elimination of

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unnecessary oversight and regulation, and produce a more
efficient system.

3. **The taxonomy of goods procured by the Federal
    Government would improve the Federal procurement
    system.**

The taxonomy would provide insight into the
structure and relationships of goods procured by the Federal
Government from the perspective of the buying process. The
taxonomy would clarify relationships among goods, thereby
enhancing observations. From this, general statements could
be made about individual categories of goods which would
help guide decisions in the procurement process.

4. **There are many areas in the field of contracting
    where the taxonomy of goods procured by the Federal
    Government can be applied.**

The researcher identified the following significant
areas of application for the taxonomy during the course of
this study:

Market Research	Unsolicited Proposal Procedures
Policy Guidance	Industrial Base Decisions
Training/Education	Profit Guidelines
Staffing	Source Selection Procedures
Procurement Reviews	Administrative Procedures
Budgeting	Clause Selection
Legislative development	Specification Selection
Regulations/Procedures	Configuration Control
Contract Type Selection	IR&D Policy
Contracting Method	Acquisition Strategy
Change Control	Workload Management
Break-out Decisions	

5. **The taxonomy of goods procured by the Federal Government would enhance the Government's ability to conduct market research.**

Literature reviews would be made easier because information would be accessed by the category to which an item belongs. The categories would serve as the bases for conducting and reporting research studies to facilitate comparison. Observations of goods within individual categories could be generalized to other goods in the same categories. Cataloging information in this manner would identify areas where greater research is needed. The taxonomy would serve as the framework for conducting organized and systematic research, revealing trends or problem areas, and ways to improve the procurement process, thus advancing the body of knowledge. The taxonomy could also be used to provide easy access to market information for use in specific procurements, making market research a viable process in contracting.

6. **The taxonomy of goods procured by the Federal Government would provide a framework for tailoring and selectively applying procurement regulation, thereby streamlining the process.**

Much of procurement regulation is blindly applied across the entire procurement process. In many cases this places an excessive administrative burden on the procurement process and lengthens the time required to complete the process. The taxonomy, by classifying goods based on

inherent characteristics deemed important in the buying

process, would provide a mechanism for tailoring or

selectively applying procurement regulation. By

streamlining the procurement process in this manner, the

Government could save significant amounts of time and money

through reduced administrative and oversight burdens.

7. **The taxonomy of goods procured by the Federal Government would improve procurement training and education by identifying the skills that are important in buying specific categories of goods.**

The taxonomy would provide a framework for

identifying and studying the specific competencies required

in procuring the individual categories of goods. The level

of complexity of the duties carried out would be identified,

and training could be tailored and prioritized in order to

get the maximum benefit from the limited resources that are

available. The taxonomy would improve procurement training

and education by linking the skills that are important in

buying specific categories of goods. Training and education

could then be more accurately tailored to meet those needs.

The ultimate benefit would be a better trained procurement

workforce.

C. RECOMMENDATIONS

The following recommendations are made as a result of

this study:

1. **Research efforts should continue to develop the taxonomy of goods procured by the Federal Government.**

With the down-sizing of the procurement workforce, decreasing budgets, and a shrinking industrial base, innovative methods of improving the procurement process are necessary. The taxonomy holds great promise for improving the efficiency and effectiveness of the procurement process.

Future efforts should continue to examine potential applications of the taxonomy. This research effort has attempted to identify potential areas of application and suggest potential benefits to be gained from the taxonomy. In doing so, the general thought process or logic of how the system could be used was presented, citing potential implications. This process should be continued, perhaps by taking a single application, in conjunction with a single category of goods resulting from Wenger's or Prendergast's study, and examining the full range of insights that may be drawn from that application.

2. **Insights revealed by the taxonomy of goods procured by the Federal Government should be used to develop guidance, not rigid rules.**

The Federal procurement process is already burdened with too many rules and regulations. The consequence is a restrictive procurement process that dictates procedures that apply in all situations, removing any room for flexibility and individual judgment. The taxonomy should be

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used to develop guidance and general principles that procurement managers can use to support individual decisions.

3. **As more goods are classified, application of the taxonomy in market research should be refined to incorporate new insights.**

As efforts continue to explore the development and advancement of the taxonomy, application of the taxonomy in market research should be refined and expanded upon. As more goods are classified, characteristics of the goods that are important in this application may become evident, requiring the addition or deletion of the characteristics used for classification. As this occurs, the application in market research should be refined to reflect the changes discovered and the insights gained from the taxonomy. The taxonomy may help to identify information not yet considered important, such as barriers to competition. The very nature of the way the Government views and conducts market research may change as a result of further development of the taxonomy of goods procured by the Federal Government.

4. **Application of the taxonomy in procurement regulation should be further expanded upon.**

Procurement regulation is far-reaching and covers a vast portion of the procurement process. This study has described how the taxonomy would be applied in several areas of procurement regulation. However, there are many more

aspects of procurement regulation that should be explored and developed. This application should be explored further in order to fully understand the potential benefits to be gained from the taxonomy.

5. **Application of the taxonomy in procurement training and education should be refined as more goods are classified.**

The way Federal procurement training and education is conducted may change as a result of the insights provided by application of the taxonomy. As more goods are classified in future studies, new light may be shed on what the training priorities should be. It is natural that the application of the taxonomy will need to be refined as new insights are gained.

6. **Of the potential applications identified in this study that were not fully explored, the areas of staffing, workload management, and acquisition strategy appear to hold great promise and should be the next areas considered.**

The process of developing the taxonomy of goods procured by the Federal Government should include a continuing effort to examine potential applications. In the researcher's opinion, staffing, workload management, and acquisition strategy should be the next areas to be further explored for application of the taxonomy. These areas are

critical to the success of the procurement process, and were

suggested as promising areas by several of the contracting

experts interviewed for this study.

D. RESEARCH QUESTIONS

Answers to the research questions proposed in Chapter I

are presented below.

Primary Research Question:

**Would application of the taxonomy of goods procured by
the Federal Government be useful in the discipline of
contracting?**

The taxonomy of goods procured by the Federal Government

would be useful in the field of contracting. This research

effort identified potential areas of application and

described the usefulness of the applications. This

validates the evaluation criterion that the classification

scheme must be useful.

Subsidiary Research Questions:

1. **Are there taxonomical applications in other
    disciplines that can be extrapolated to the
    contracting field?**

The research conducted in support of this study

indicated that taxonomical applications in other fields were

primarily in the area of discipline research. The

taxonomies provided a framework for organized and methodical

research to assist in the development of theories within the

discipline. This was also the original impetus for

classification studies within the field of contracting and
is indeed applicable to the field.

Outside of the area of discipline research, the
applications discussed in this research effort were based
primarily on applications in the field of marketing where
classification schemes are used to provide strategic
insights in the decision making process. This is supported
by the fact that the Wenger taxonomical model was adapted
from a marketing classification scheme.

2. **What are the potential applications of the taxonomy
   of goods procured by the Federal Government in the
   field of contracting?**

The potential applications of the taxonomy in the
field of contracting have been identified by the researcher
as follows:

Market Research	Unsolicited Proposal Procedures
Policy Guidance	Industrial Base Decisions
Training/Education	Profit Guidelines
Staffing	Source Selection Procedures
Procurement Reviews	Administrative Procedures
Budgeting	Clause Selection
Legislative development	Specification Selection
Regulations/Procedures	Configuration Control
Contract Type Selection	IR&D Policy
Contracting Method	Acquisition Strategy
Change Control	Workload Management
Break-out Decisions	

3. **What are the most promising application of the
   taxonomy in the field of contracting?**

The most promising applications of the taxonomy are
in the areas of market research, procurement regulation, and
procurement training and education. These are areas where

the Federal Government has significant problems and even small improvements would yield great benefits because of their far-reaching influence on the procurement process. They are also areas that lend themselves well to the insights and guidance that the taxonomy would provide. These applications were expanded upon in this research effort. One additional area that was only briefly discussed in this study, which in retrospect, and as suggested in several interviews, should be included among the most promising applications, is the area of staffing.

4. **In the most promising areas of application, how would the taxonomy be applied?**

Specific applications were presented in this study. The key element of the process is to identify the characteristics of the goods in specific categories, understand what the implications are in the procurement process, and then use the information in support of the decision making process.

5. **What are the benefits of applying the taxonomy of goods procured by the Federal Government in the most promising areas selected for examination?**

The specific benefits associated with the most promising applications were discussed in the study. The overall benefits of applying the taxonomy would be the ability to tailor various aspects of the procurement process to the specific categories, removing layers of inefficiency,

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and streamlining the process. The ultimate benefits would
be large dollar savings and a faster, more responsive
system.

E. AREAS FOR FURTHER RESEARCH

The following areas of further research are recommended:

1. **Explore the possibility of combining goods and
   services in a single classificatory scheme.**

A debate is being conducted in the field of
marketing as to whether there should be a single
classification scheme for goods and services. Arguments
have been made both in favor and against this concept.
Wenger's taxonomy of goods procured by the Federal
Government was adapted from a marketing goods classification
scheme. Allen's taxonomy of services procured by the
Federal Government was based in large part on Wenger's
taxonomy of goods. The two models are very similar in many
respects. Further research should be conducted to examine
the possibility of combining goods and services in a single
taxonomical structure. It would be beneficial to resolve
this issue before moving further in either direction,
perhaps saving a duplication of effort or having to back-
peddle and cover ground that has been missed.

2. **Examine whether the best source for data collection would be the buyers, requirements personnel, or users of the goods.**

Prendergast concluded that the data collection scheme needs to be reviewed and streamlined. (Prendergast, 1991, p. 91) He also suggested researching the level of knowledge of buyers. (Prendergast, 1991, p. 97) The level of knowledge of buyers impacts the data collection scheme. An additional aspect that should be considered, perhaps in conjunction with the other aspects suggested above, is which source of information, buyers, requirers, or users, would prove to be the best source for data collection.

3. **Explore the possibility of expanding application of the taxonomy to non-Government areas.**

As suggested by one contracting expert, the concept should be expanded to non-(Government) applications as well. The concept may apply to civilian applications as well as Government applications, with some modification of the existing characteristics. This approach may encourage wider analysis and speed the process of examination as well.

F. CHAPTER SUMMARY

This chapter presented the conclusions and recommendations resulting from this research effort, answered the primary and subsidiary research questions, and recommended areas for further research.

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APPENDIX

LIST OF EXPERTS INTERVIEWED

Arvis, Paul F., Professor, Florida Institute of Technology, Fort Lee, Virginia.

Beck, Alan W., Professor, Defense Systems Management College, Fort Belvoir, Virginia.

Coates, Elinor Sue, Instructor & Consultant, Coates & Company, San Francisco, California.

Garrett, Gregory A., Former Assistant Professor of Contracting, Air Force Institute of Technology, Wright-Patterson AFB, Ohio.

Haugh, Leroy, Vice President, Aerospace Industry Association, Washington, D.C.

Hearn, Emmett, Instructor, University of California, Berkeley, California.

Lessig, James B., Logistics Management Institute, Former National President, National Contract Management Association, Washington, D.C.

Macfarlan, W. Gregor, Harbridge House, Inc., National President, National Contract Management Association, Alexandria, Virginia.

Meneely, Frank T., Professor, Defense Systems Management College, Fort Belvoir, Virginia.

Sapp, Richard S., Ph.D., Vice President, Product Assurance, Lockheed Corporation, Solvang, California.

Sherman, Stanley, N., Professor, George Washington University, Washington, D.C.

Zemansky, Stanley D., Consultant & Retired Director of Purchasing for Baltimore, Maryland, Paradise, California.

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